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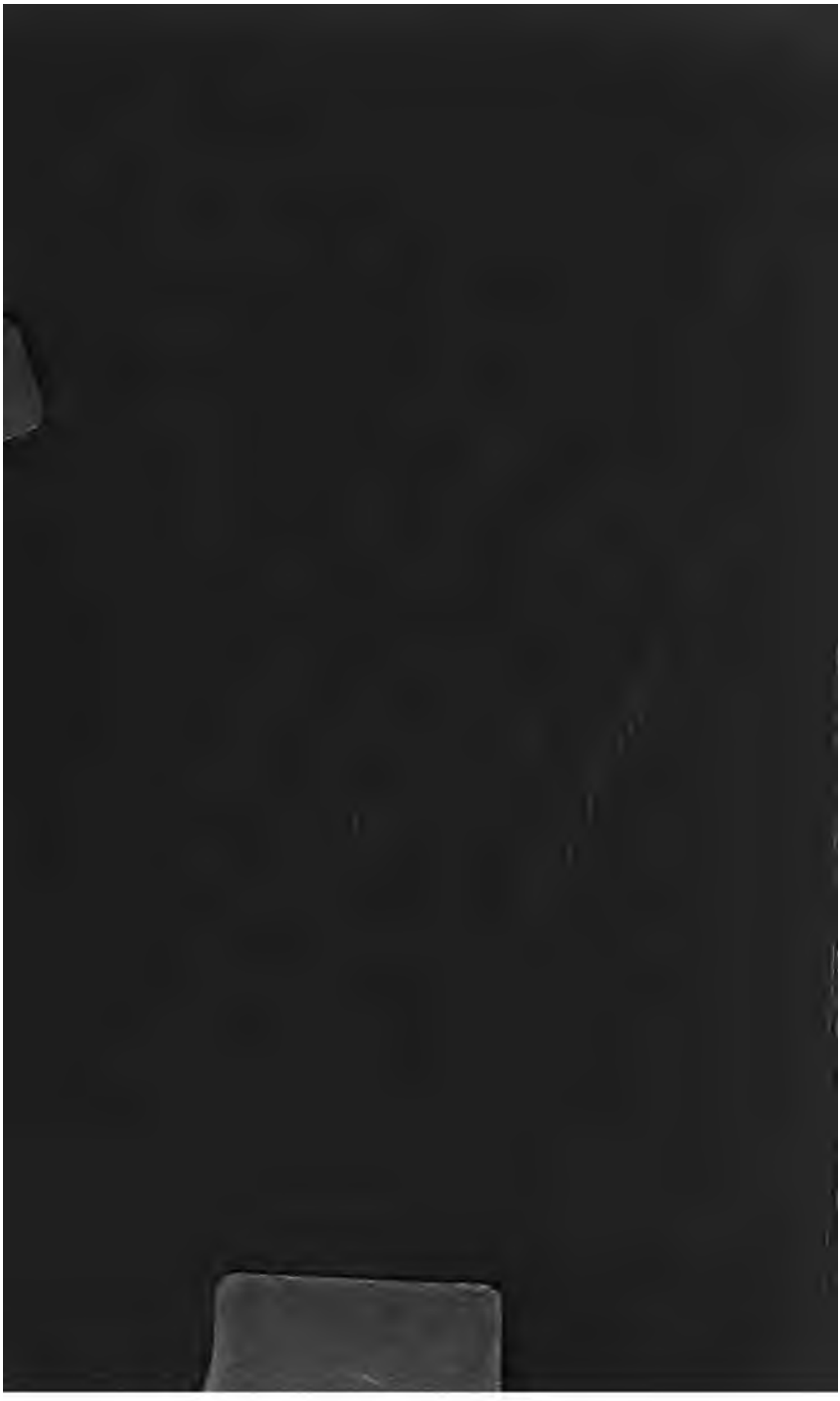

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THE MILITARY RESOURCES OF PRUSSIA AND FRANCE

AND

RECENT CHANGES IN THE ART OF WAR.

BY
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REPRINTED FROM 'THE EDINBURGH REVIEW.'

LONDON:
LONGMANS, GREEN, AND CO.
1870.

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PREFACE.

THE FOUR ESSAYS which are collected and republished in this volume were written and published in the *Edinburgh Review* between the years 1864 and 1867. Europe in those years was still at peace, interrupted only by the short but decisive contest of Prussia against Austria and some of the minor German States in Bohemia, Hanover, and on the Maine. But it was an armed peace, indicating the approach of the great war which has just broken out; and during the whole of this period military preparations were carried on upon an enormous scale, and changes of unprecedented importance were effected in the levies, the organisation, and the armaments of the leading States of the Continent. The obligation of military service was enlarged by law to such an extent that it has become possible to bring within a short time the whole male population of a country under arms, and to collect at a short notice armies of extraordinary magnitude in the field. The resources of science, and the appliances of art were introduced in military operations. Rail-

roads, electric telegraphs, and new modes of destruction were made available for military service, for the transport of troops and supplies, for the transmission of intelligence, and for the defence of fortresses. Above all, the whole system of armament has been changed and improved—rifled ordnance has given a range and precision to artillery which were before unknown—the use of hollow projectiles from field-guns and siege-batteries has almost superseded the use of round shot—small arms have been rapidly exchanged from the old smooth-bore musket to the rifle, and from the rifle to the breech-loader; and, in short, the armies which have just taken the field differ from the armies commanded by the first Napoleon or the Duke of Wellington almost as much as the latter differed from the Roman Legions.

The object of these articles, at the time they were written, was to convey to the public a knowledge of these important changes, which could not fail to produce very important effects, if, unhappily, war should again break out in Europe. The information they contain is believed to be correct, down to the moment at which they were published. And although some further changes have since been made, for the course of improvement has gone on with ceaseless rapidity, yet these papers describe with sufficient accuracy the nature of the revolution which has taken place in the elements of warfare, and the actual condition of the military institutions of the two Powers of the first rank, Prussia and France,

which are now arrayed against each other on the banks of the Rhine.

The Essay on the Military Institutions of France was published in July 1867, a year after the battle of Sadowa. That memorable event disclosed to the world an amount of power in Prussia and the German States to which she has since more closely allied herself, which convinced the French Emperor and the French nation that it was necessary to reorganise and augment the military resources of France, if that Empire was to hold her ground against her formidable neighbour. Many of the defects pointed out by General Trochu and the writer of this paper were consequently remedied, and the Law of February 1st, 1868, on the recruitment of the Army, and the organisation of the Garde Nationale Mobile, was passed by the French Legislature. The text of this Law is printed in the Appendix to this volume, in order to supply any deficiencies which may exist in a statement prepared at an earlier period. The results of the Law are now before the world. Since 1794 no such levy of men has been seen in France. The authors of the law calculated that it would enable them to call 1,200,000 men to arms; and it is probable that this number will be exceeded by the large number of voluntary enlistments which are taking place.

Some indulgence might not unreasonably be asked for the work of a civilian, practically unacquainted with military affairs, who ventured in 1864 to de-

scribe the relative merits of the 'Rifled Ordnance of England and France.' And moreover, the experiments and inventions of the last six years have largely extended the improvements which were then in their infancy. But this article was based on materials and information almost entirely supplied by French officers of the highest authority in their arms, and it was revised by competent military authorities in this country. The writer therefore lays no claim at all to any merits it may possess. Its deficiencies may with greater fairness be laid to his charge. The important point, however, is that the views it contains on the relative merits of the French and English systems of field-guns are sound; and, in fact, the most recent changes introduced into our own armaments have almost all tended to assimilate them more closely with the French system. On this subject, however, great progress has been made since the article was written, more especially in the fabrication and mounting of heavy guns for ships and forts: and much more remains to be learnt.

It should here be stated, that the two first Essays in this volume, on the Military Resources of Prussia and the Art of War, are from the pen of Colonel Chesney, and were written quite independently of those which follow on the Military Institutions and Rifled Ordnance of France.

In conclusion, it is almost superfluous to remark, that as these papers were written entirely for the purpose of rendering a certain amount of historical

and scientific knowledge of military affairs accessible to the public, so they are now published without any political object whatever, and nothing can be farther from the intention of the writers than to exalt or disparage the armies of either of the great belligerents between whom it is our duty to observe a strict neutrality. He must be not only a bold, but a rash man, who would venture to predict the result of the conflict of those tremendous, and in fact, unknown forces. It is only by the application of the fixed general principles of the art of war, and by the study of the novel and peculiar conditions under which this war is to be carried on, that anyone can hope to form an enlightened judgment on so difficult a question.

LONDON :
August 1, 1870.

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RECENT CHANGES IN THE ART OF WAR.[1]

[*Reprinted from the* EDINBURGH REVIEW, *January* 1866.]

IN TRACING the main currents of thought which influence our time, and their effects upon public policy, a strange disagreement is at first apparent between the desire for peace professed on all sides by publicists and statesmen, and the activity of every great Power in the improvement of the means of war. Very different are these days, it would seem, from those of the preceding generation, when a millennium of trade, unbroken by the clang of arms, was held by many thoughtful politicians to be the future condition of the civilised world,—when even in the military profession men of the highest education and intelligence were heard to declare that Europe would never again hear the tread of great armies in the field, and that the British soldier need henceforth prepare to meet no more disciplined enemy than the Maori or

[1] 1. *Sur la formation des troupes pour le combat*, par le général Jomini: Brussels, 1856. 2. *Modern Armies*; translated from the French of Marshal Marmont by Captain Lendy: London, 1865. 3. *Études tactiques*, par le général baron Ambert; 1ère série (Zorndorf et Austerlitz): Paris, 1865. 4. *Tactics of the Three Arms*, by Colonel Lippitt: New York, 1865. 5. *Modern Warfare and Modern Artillery*, by Colonel Macdougall: London, 1865. 6. *The Manœuvres of Cavalry and Horse Artillery*, by General M. Smith, C.B.: London, 1865. 7. *Professional Papers of the Royal Engineers*; new series, vol. xiv.: London, 1865. 8. *Military Operations Explained and Illustrated*, by Colonel Hamley, R.A.: London, 1866.

the Sikh. Then all was stagnation within our fleet and army, as all was neglect without. India was looked on as the only field where military ability could be the stepping-stone to fame. Reduction and retrenchment were the order of the day; and, faithfully reflecting the national feeling in the national service, the officer regarded the few among his fellows who gave their spare hours to the study of their profession as mere eccentrics, led by some strange aberration of intellect into a pursuit tedious in itself and tending to no practical result.

Very different is the public sentiment of our time. Instead of a government commending itself to the country's approval on the score of a blind undistinguishing economy, a statesman, the most experienced and renowned of our age in foreign and domestic policy, not long before his death, avowed that the enlightened attention of the Ministry he directed had been systematically given to the care of our national armaments, and claimed their improvement and development as special grounds of public confidence. 'The present time,' said Lord Palmerston in his last manifesto to the Tiverton electors, 'is remarkable for the progressive application of the results of science to the operations of war, both by sea and by land; and this country has not in such matters lagged behind the other great Powers of the world.' Even his opponents gave the late Premier credit for knowing accurately how the national pulse beats, and for being well acquainted with what our neighbours are doing. And his assertions are borne out to the full by our increased expenditure for defences and by the formation of our self-created Volunteer army, as well

as by the large share allotted to topics of military interest in the journals of the day, and by the attention paid to the progress of science in this particular direction by thoughtful men, both in and out of the service.

The art of war—to use the recognised term—is one of those sciences which time has seen by turns improve, stand still, retrograde, and again take a sudden advance, side by side with the general civilisation to which its condition seems bound. The most recent events in the history of the world give us no hope of the speedy realisation of that Utopia, not long since dreamed of, where its use shall be unknown. And if it be acknowledged as a necessity of the existing state of things, its progress should follow closely that of other great branches of knowledge which affect the general good. For, viewed in its highest aspect, it is but the application of a nation's strength to the protection of the commerce, freedom, and order of its citizens; and recent abuse of warlike power for the mere purpose of aggression is but a fresh proof that to be independent it is necessary to avoid that decay of military resources which may invite attack. Happily, such pages of our history as the Indian Mutiny show that the advance of British wealth and science has in no measure diminished that spirit of personal sacrifice without which the warrior, though engaged in the fairest cause, would find but little honour paid to his profession. Steam, rifled arms, and railroads have not slain knighthood, nor taught us to undervalue the true soldier and his deeds.

But courage and patriotism are but of little avail

when ill-directed and untrained, or destitute of the needful appliances from which they should receive support. The case of Denmark has shown too painfully how brave men are sometimes sacrificed for lack of warlike material and of the strategy which might supply its place. The successes of the Federal generals, in the West especially, have drawn attention to the advantage in war of a ready use of every improvement in mechanical art. And more striking still as an example, the brief campaign of 1859 showed the astonished world the practical results of the diligent improvement by France of her Algerian and Crimean experience. Austria found her utmost efforts unequal to those of her better-prepared foe, and succumbed in the struggle, before Prussia dared resolve to throw her scattered and half-organised forces into the scale for German honour,[1] or the Bund could gather its unwieldy legions on the Rhine.

Such lessons as these should not wholly be neglected by any nation possessing a permanent land force—least of all by one which holds a vast and distant empire mainly by the power of the sword. It is our purpose, therefore, to review the existing state of military science, as a whole, with special reference to the modifications which the modern conditions of warfare in the field have lately undergone. An article in these pages[2] was lately devoted to the special question of rifled guns, and drew attention to the

[1] Those who were present at the assembling of the Prussian and Bavarian *corps d'armée* on the Rhine in June 1859, and at their disbandment on the astounding news of the Villafranca treaty, saw that the regiments of the Landwehr were not in any fit state to take the field, being scarcely more mobile than our battalions of county militia.

[2] Edinburgh Review, April 1864.

striking difference of the principles on which our own artillerists and those of our great neighbour have been at work. But the tactics of different nations have diverged more widely still. Nor is the contrast more startling between the Armstrong gun in broadside and the 450-pounder smooth-bore in its turret, to which our American rivals pin their faith, than between the agile scramble of the Zouaves up the Alma heights and the long-drawn movements of the army of the Potomac through the woods before Richmond. And great as is the difference between these operations of the same period, still wider differences may be traced between the tactics of modern armies at different eras. A brave man is now, indeed, according to the lament of Bayard, 'exposed to die by a miserable pop-gun, from the effect of which he cannot defend himself;' yet the levelling of all engaged in action to one common risk has not only tended to exalt true valour, but has exercised ingenuity in a hundred ways in the endeavour to spare the lives of combatants, and to meet increasing peril by increased lightness and dexterity. In these efforts for economising the numbers employed until the supreme moment of conflict be reached, lies the key to most of the past and coming changes of modern tactics.

Although the grand principles of strategical combination are, as we are constantly told by military writers, the same in all ages; although now, as in the days of Cæsar, it is of the first importance for a general to keep his forces united or ready to unite; to leave as few points vulnerable as possible; to maintain free lines of supply for his own army, and to

harass or break those of the enemy; above all, to bring an overwhelming mass to the striking-point when the attack is made: yet the means of doing these things are so greatly enlarged by the improved communications prepared in time of peace, and by the superior wealth of town and country, giving facilities, hitherto unknown, for the feeding and moving of great hosts, that in Europe, at all events, there is an inevitable tendency to accelerate events in time of war. Such campaigns as those of Marlborough and Saxe in the Low Countries can no more be repeated on the same soil than the battles of Chancellorsville and the Wilderness could have been fought as they were, had the wooded swamps of Virginia been changed beforehand into well-drained fields. The single invention of railroads would have modified, it is not to be doubted, the strategy of Napoleon himself. It is very possible that its general application would have greatly lessened the superiority of quickness in combination which he enjoyed even to the moment of that last essay of invasion which ended at Waterloo. But, on the other hand, had his tremendous assault on the Russian Empire been aided by the resources of supply which even one well-guarded railroad would have offered, it is certain that the enterprise would not have broken down from the cause which was immediately fatal to it. And the great modern conqueror was the last person in the world, his whole life assures us, to have slighted the aid offered to his designs by the progress of mechanical art.

Since the conditions of warfare are thus liable to change with the changes of time, it is surprising, at

first sight, to meet with such periods of stagnation in military science as mark certain epochs of history. This stagnation has especially been felt in England, a country where the soldier's profession is often unpopular, and the expense of a standing army distasteful to the people. The wondrous successes gained by Marlborough's great genius for war for a time overbore this national prejudice, and lent a charm to the history of our campaigns in Flanders, which we see reflected in the pictures of Corporal Trim and Uncle Toby, honoured relics of an illustrious time. But after the Peace of Utrecht our continental operations had little to flatter the popular fancy. Blundering King George just saved from ruinous disgrace by the hard fighting of his troops at Dettingen; his soldier son leading our troops in the true spirit of military pedantry to certain defeat at Fontenoy, and in later days, with strategy no better than his tactics, yielding Hanover, almost without a blow, to be plundered by Richelieu's greedy army; the noble charge which shattered the French centre at Minden[1] forgotten in the shameful immobility of Sackville's cavalry: these were not pleasant memories of our chief campaigns: and with these in view, redeemed only by the one ever glorious leap of Wolfe to Abraham's Heights, our military reputation waned and sank into oblivion.

Then came the American war, with its sad tissue of blunders by land and sea, in council and in field; the hired troops; the divided commands; the reckless disregard of all strategical rule; the incompetent

[1] In the monument erected on the field in 1859, the centenary of this great battle, the Germans have omitted all notice of the contingent of six battalions of British infantry, whose valour decided the day.

commanders—men who might well make even the overbold Minister tremble who allowed them to go forth in the name of England. The failure of our attempts to reconquer our colonies matched well with the policy which had made them our enemies, and left upon the public mind at home a deep-rooted dislike to those enterprises of our troops which had served but to lower our prestige and to enlarge our debt. To the navy, as the arm to which belonged chiefly such credit as was won in these wars of the last century, flowed the tide of popular confidence, and the sister service came to be regarded merely as a necessary evil, part of the trappings of the king rather than of the protection of the subject. Nor were matters better managed across the Channel, where the once formidable army of Turenne and Saxe had become a mere booty for the crowd of spendthrift noblesse; where, as in the other armies of the Continent, all discipline and training had sunk into a mere dull imitation of the stiff precision of Frederick's later days, and Potsdam, rather than Rosbach or Leuthen, had become the one model after which the marshal's baton and corporal's stick drove and trained the rigid lines.

From the thraldom of such a system as this the Great Revolution came to deliver first the land where so many other abuses were to be swept away. France rushed under arms to defend her new-won liberties against the pipe-clayed soldiers of Germany, and the stagnation which had oppressed all military thought —offspring of a misdirected worship of one great military reputation—vanished at the shock of a truly national soldiery. For such were eminently

the volunteers of 1792 and 1793. Condemn the Convention and its decrees. Execrate with just severity the tyrannous rule of the bad men who seized the reins of power amid the terror of the community; yet the fact remains, that the original movement which successfully opposed activity to discipline, and the bold dash of courage to the long training of the serf, was as genuine and patriotic as it was fervent and sudden.

Then sprang to light a new method of war, the foundation of a long series of victories. The enthusiasm of the volunteer—the swift road opened to the soldier's chief prize, military rank—the intelligence of a high class of recruit (of such Moreau was an instance), embracing arms under the pressure of a time ruinous to other professions—these, and supplies of men ever pouring from the crowded depôts, atoned for defaults of drill and lack of *matériel.* Scarce enough were cavalry and artillery in these early armies of the Revolution, for the Convention found it easier to call for than to create the necessary horses to equip them. But a swifter impulse given to the masses of foot than any army had hitherto known supplied every need. These half-drilled volunteers, in their columns, moved as much more rapidly than the German lines, as those dull copies of the battalions of Frederick outran the unwieldy order of battle which his tactics superseded. In vain did the French printed instructions (quoted in the recent treatise of the veteran writer Jomini) provide that 'the deployed order should be the only one used in battle, columns being reserved for partial combats, such as the attack of isolated posts, villages, &c.;'

the Republican generals soon found that their troops, little practised on parade, could only be moved to assault by a general use of the system of columns. And since the latter were too conspicuous as marks to be thrust unaided within the enemy's reach, the addition was made at the same time of numerous skirmishers thrown out along the front to force back the hostile lines by a biting fire from every available cover, being in fact a direct copy, as far as circumstances allowed, of that harassing system of the American riflemen which their best officers had seen employed with such success in the campaigns of Washington and Lafayette. Thus were born the new Tactics, soon brought to perfection by wars carried on upon the broken ground which forms much of the frontier of France, and found upon trial to be everywhere the most formidable means of attack. Add to them the high average intelligence of the French soldier, and the instrument was prepared wherewith Napoleon was destined to overthrow successive combinations of the most formidable armies of Europe.

Let those who have watched the care and training which are required in order to perfect the deployed movements of a single regiment, to enable it whilst thus extended to take a new position, or even to change its front, conceive such manœuvring applied to forty or fifty battalions at a time. Not under the most favourable circumstances could the machine move otherwise than with laborious slowness; and to attempt the outflanking of an enemy, or the occupation of a new position by surprise, must have been a task beyond the powers of any but a Frederick matched against a Frederick's slow opponents. Yet

this was the system by which the Republican armies were to be vanquished and the Republic subdued! Against it dashed the new audacious tacticians, moving their forces in a somewhat disjointed manner indeed, but with a rapidity hitherto wholly unknown; turning, dividing, distracting their enemies, and appearing at such wholly unexpected points, to renew their often baffled assaults, that their repulse appeared but as a feint to the slow defenders of the position they attacked. In perfectly open and level ground the enemy's infantry would have been their match and his cavalry their destruction; but such parade warfare seldom occurs even in Europe, and the allied generals felt their own manœuvring (which assumed the foe to be always exactly in their front) to be quite inadequate to the new occasions which arose.

Not that the Republican levies met with much continued success in their earliest campaigns. On the contrary, their ill-discipline exposed them to some very severe checks. In the face of cavalry, especially, these improvised soldiers behaved at first with such disorder as has been only repeated since in the defeats of the Federal volunteers at the commencement of the late American war. The teachings of necessity and a certain natural quickness soon overcame this defect, by instructing them in the art of using the advantages of cover more than had ever been done before. Placed behind ravines, hedges, or the long rows of trees which so often take the place of enclosures in continental countries, they soon found themselves more than a match for the well-trained squadrons led against them; whilst their first panics gave them a strange advantage by inducing a care-

lessness[1] on the part of the enemy's horse which often did away with his original superiority. The commanders of the allied infantry were, in general, even less fortunate. Envious of the increased rapidity shown by their foe, they introduced a system of movement by detached columns—not masses like those of the French, but mere fractions of their old battle order, marching at open distance as though ready to deploy at the word, and disconnected with one another. This innovation broke up the solidity of the old German line without giving any compensation for its loss. The battles of the early years of the Revolution were fought in a fragmentary way, the contending forces being thrown over an extent of ground totally disproportioned to that they were competent to hold; and every action was reduced to a series of partial combats carried on without regard to unity or general plan, with results beyond the control or even the immediate knowledge of the commander-in-chief. Of this we have a very striking instance in the victory of the French in the year 1794 at Fleurus, when the Allies retired on the news of the fall of Charleroi. For three days they had vainly advanced towards the place with straggling columns directed on so many different points of a vast semicircular front, as to make no general progress in spite of partial successes at each extremity. The change wrought by the improved tactics which were to be hereafter learnt by the Germans in bitter

[1] The Archduke Charles, in his 'History of the Campaign of 1796,' complains bitterly of the error of the Austrian cavalry in repeatedly following the enemy's skirmishers into broken ground, thus throwing away all the advantages of speed; and he attributes this vice to their former easy successes.

lessons, was finely illustrated on this very ground twenty years later, when Blucher drew up on a front of three miles, for his battle at Ligny, a force scarcely less than that which Coburg had dispersed over thirteen!

Then came a new era in warfare. The world was to be made acquainted with such a change in Strategy, the art which rules the greater combinations of war, as should for a time throw altogether into the shade the study of mere tactics. The genius of the young prince Charles, improved by observation in the field, and by a year's devotion to study in retirement,[1] wrought in Germany in 1796 wonders such as were only eclipsed by the still greater exploits of Napoleon, who at that very time began his career of conquest by overrunning the fair plains of Italy. Neither the discipline nor the spirit of the Austrian troops can claim the merit due to the Archduke's campaign in the former theatre, for they failed to hold the ground for an hour against his brilliant rival on the other side of the Alps. Yet was Charles's triumph over the then famous generals of the Directory, Moreau and Jourdan, hardly less remarkable than that of Bonaparte over the feeble veterans whom he overthrew in Lombardy and Venetia. The servile manner in which our military historians follow those of the Imperial school makes the story of Bonaparte's victories of 1796 familiar enough. Yet had it not been for the sudden inspi-

[1] During the year 1795 the Archduke was kept from the armies by illness contracted in the field; and it is recorded that he gave his leisure solely to the study of theory. The early age (eighteen) at which he had taken up arms had hitherto deprived him of the opportunity.

ration of the French army of Italy, caught from their new chief, the year would have been gloomy enough in the annals of the Republic, whose best-equipped and greatest armies were successively out-manœuvred and driven from Germany by the mere youth who, for a brief space untrammelled, wielded with a giant's strength the slow resources of the old Austrian *régime*. Let us inquire what was this sudden development of the soldier's art which changed on either side the whole features of a hitherto tedious and uncertain warfare. Was it something that Gustavus, Marlborough, and Frederick had missed; or the mere revival of a part of military science known to these great men but disused in an age of dull mediocrity?

Strategy (says Marshal Marmont, whose *chef-d'œuvre*, 'L'Esprit des Institutions militaires,' Captain Lendy has rendered good service by translating) has a twofold purpose:—

1st. To reunite all our troops, or the greatest possible number, on the spot where the battle is to be fought, when the enemy can only muster a portion of his; in other words, to secure a numerical superiority of numbers for the day of battle.

2nd. To cover and secure our own communications, while we threaten those of the enemy.

Definitions similar to these in substance may be found in the works of other writers mentioned at the head of this article; but none has pointed out so plainly as the Marshal the vast differences between warfare in its modern aspect and as known to the ancients. And even he, though taking much pains in his Introduction to show how wide these differences are, and how the changed mechanism of warfare has

transformed the art once practised by Alexander, Hannibal, and Cæsar, yet does not give himself sufficient space in any part of his handbook to trace the gradual development of the highest of its branches, that of the combination of the general movements. Though not always a blind admirer of his imperial master, he follows in his brief chapter on Strategy the general view of those worshippers of Napoleon who ascribe to the example of his peculiar genius whatever other modern strategists have done successfully in the way of concentrating great armies for decisive operations. But this theory, so flattering to French pride, and so generally (as we fear) accepted, falls to the ground at once when we peruse the account by the Archduke Charles of his own actions in 1796—much recommended by Marmont as a study, and as, in his own phrase, 'a picture of high military art'—and discover that his combinations were as far-reaching as those of Napoleon, whose lessons the world had yet to learn. Without going into particulars, it may just be stated that the theatre of operations in Germany was more extensive than that of Northern Italy, the marches in it as severe, and the success of the Archduke (excluding the advantages gained by Bonaparte's bold diplomacy) not inferior to that of his rival. The year 1796 was, as before said, a true era in war; and something more than the genius of a single man must be found to account fully for the change.

The fact is that the application to actual warfare of those principles which in the Marshal's words above cited appear so simple—a difficult practical problem at any time—has been vastly complicated by

the increased civilisation of the age. Certain elements to be considered—as the moral power of the general, the discipline of the troops, the knowledge of the enemy's weak points—affect its solution now as much as in the days of Cæsar. But when these are fully grasped, the movements of the strategist for the double purpose of fighting to advantage, or of securing in any event the superiority of communications, depend upon his choice of the lines of operation, and of the value he may attach to certain decisive points to be gained and held; whilst the variety of these, with the innumerable combinations which are presented in a highly civilised country, is so great, that neither closet study nor practice in the field can alone suffice to ensure a successful end. The wider the extent of territory in the operations to be embraced, and the more varied the means of transit, the greater the difficulty of selecting that course which is the best for the ends in view.

Given a country of semi-barbarous nature where the hand of man feeds him but from day to day and does nothing for laying open the resources which the eye of the cultivator cannot reach, strategy would have little to take into consideration but the natural features of the ground. The course of the rivers, with the character of the hills or mountains which determine their flow, and the extent of forest and marsh, would fix the decisive points to be won, few comparatively in number. But traffic, with its needful communications, multiplies these infinitely, and with them the doubts and the opportunities of the defender or invader. Genius here displays itself by its full and certain grasp of the obstacles or facilities

which a large tract of such country contains, by its power to overcome the one and to use the other for those rapid concentrations which are alone possible where supplies are abundant and communications good. And so great are the impediments to the full execution of any such plan on a grand scale, that no thought or care can supply the place of that gift in which lies the sublimer part of the science of war. Over-confidence in his own powers hurries a second-rate general to ruin—witness the fatal advance of Hood into Tennessee; the self-doubt, more common to such commanders, brings hesitation, leading no less to disaster—witness the vacillation of Giulay at the opening of the war in 1859. Nay, he who is successful to the full on a moderate *terrain*, as Grant at Vicksburg, may fail in a combined operation on a larger, as did the same general in Virginia in the spring of 1864. Supreme genius itself may fail to solve every problem, as Napoleon's unsuccessful strategy in 1812 and 1813 plainly shows to the unprejudiced observer. In short, it may be held as certain, that with advancing civilisation, increased wealth, more rapid and certain communication, strategy will enlarge its sphere and become bolder and more decisive, as it will also make larger demands upon the intellect of the chief. Steam, railroads, and commerce increase the advantage which superiority of conception always claimed; just as the growth of Europe in agricultural wealth and the improvement of her highways enabled Napoleon and his contemporaries to use a strategy which to Frederic and Marlborough seemed too bold, or was only applied by them in countries perfectly friendly,

open, and well tilled beyond the custom of their time.

Nor let us doubt that mankind will greatly be the gainers by the change. Whatever increases the rapidity with which the great machines called armies are worked, and causes the fate of a war sooner to be declared, will diminish the suffering caused by the struggle to the population. The more perfect the system of supply and conveyance, the more striking the strategy, by so much the less will it be worth the while of generals to prolong their operations for the purpose of subsistence, and of governments to hold out for unreasonable terms in the hope of wearying out the foe. Schleswig might have been as many months a field for contending forces as she was days, had not their railroad system enabled the Germans to concentrate an irresistible force before the Dannewerk at the very outbreak of the war, and to terminate a delusive contest by driving the Danes at once to their intrenchments, limiting the campaign thenceforth to the dimensions of a siege. The South would not have been enduring the depression which still overwhelms her had the Federals been in readiness to bring to the defence of the Union the gigantic odds which we now know them to have commanded. From the prolonged horrors of a Thirty Years', even of a Seven Years' War, the world is delivered by the changes which have made it possible to decide the fate of nations, as in the campaigns of Hohenlinden, Jena, Waterloo, Novara, in the first few days of conflict. Anyone who visited in the autumn of 1859 the highly cultivated plain of Northern Italy, on which the fate of the Peninsula had so recently been decided

by two great battles, could not but be amazed at the slight and transitory vestiges of so great a conflict. The tendency of strategy being evidently in this direction, as may be seen from the preceding considerations, and its theory unchanging, while in practice it becomes bolder with increased means, it remains to trace the development of the tactical part of warfare under the most modern conditions—in other words, to see what improvements have been made during the past sixty years in the use of the various arms in face of the enemy.

If it be true, as we believe all history shows, that the power of strategical combination, and of mastering thoroughly the proportionate difficulties of each part of a large theatre of war, are the gift of a far-seeing genius alone, it is no less certain that a high order of ability is requisite for what some writers have not scrupled to treat as a merely mechanical part of warfare, the successful handling of a large body of troops in actual conflict. But between these two accomplishments there appears to be one essential difference. Practice can form or improve vastly a tactician, whilst it can do but little to supply the natural want of strategical power. Assuming from the general verdict of military writers that in Napoleon is to be found the highest example of this latter gift, we have only to compare carefully his campaigns, the objects achieved, and the resources with which he set out, to discover that no part of his career is so brilliant as that early one already referred to, when he entered Italy an almost unknown general of the Directory. Not only did he fail to improve in his later years but (in the words of Marmont) at the

period of the Russian invasion 'he had commenced to exhibit a marked preference for direct attacks, for the employment of sheer strength, and a certain contempt for the assistance of art and combinations requiring mental effort. He gained the victory, but at the cost of immense losses and with insignificant advantage.' In the following year (1813), his operations in Germany have been criticised with just severity by other writers, as well as by his ex-Marshal —notably by Sir G. Cathcart in his invaluable Commentary: whilst his brilliant display of resistance to the invasion of France in 1814, a period much gilded by the efforts of the Imperialist school of historians, was marked by three bloody defeats and one indecisive engagement, of which actions Marmont, with cooler judgment than many of his countrymen can bring to the subject, says, 'These battles (of Brienne, Craonne, Laon, and Arcis) could not be of any advantage, for either the enemy was already concentrated, or the direction of the attack was wrong.' In short, we may read in the story of the greatest modern conqueror, that practice on the grandest scale never enabled him to improve on the prodigies of his youth, when the activity of his soldiers, and the means afforded by a rich and highly populous country, were so fully understood and so instantly applied to the right ends, that his first opportunity became the swift high road to fame, fortune, and power. Had he died when the treaty of Campo Formio closed his first campaign, he would yet have left behind him an unsurpassed reputation as a strategist; for with an army notorious for its unfurnished commissariat and irregular discipline, he

overthrew, by pure generalship, a succession of hosts equal or superior to his own in all material respects, the one secret of his success being (as it has been happily summarised) to turn every position, and beat the enemy in detail, before they were able to unite their forces.

But all this was done before he had had time to attempt, in any way, to improve the tactics of his troops, which though quick as compared to those of the Germans, were of a rough uncertain sort; and, as we have seen, the French armies in Germany, at this very epoch, were meeting at the Archduke Charles's hands continued disaster and defeat. The course of events then hurried him to Egypt; and when he next stepped as First Consul upon the theatre of European conflict, to redeem the flag of France from the repeated disgraces it had suffered in his absence, his means were still small, and his troops ill-trained and half equipped. But his task was immensely aided by the folly of the Austrian General Mélas, who, confident in the superior numbers and *morale* of his troops, flushed with their recent successes, dispersed them over the whole of North Italy from Mantua to Tuscany and Nice. Napoleon solved the problem before him, and illustrated once more the surprising resources which strategy gives to an active commander, by throwing his army so suddenly over the Swiss Alps through Milan to the Po as to sever his enemies at once from their base and from two important divisions of their command, whilst retaining for himself free communication with France. The Austrians turned with their main body, and fought fiercely at Marengo, where a happy charge

of Kellerman's and the personal judgment and activity of Desaix saved the First Consul from the defeat which he—as he admitted in his Memoirs—had invited by rashly detaching two-thirds of his force, and left him that superiority of position which enabled him, the battle once gained, to dictate terms to the foe. The more striking victory won soon after by Moreau at Hohenlinden gave a triumphant peace to France, and allowed her ruler to apply himself to the double task of ridding his path of domestic opponents, and of preparing the force of the Empire for such a career of foreign aggression as the modern world had not yet dreamed of.

We have been thus particular in tracing the rise of Napoleon, because in its successes may be plainly traced the distinctive character of the two branches of the military art which are here to be considered. Strategy had suddenly—partly, but as has been shown, not entirely, owing to the genius of the great Corsican—advanced by so rapid a stride as to assume its proper prominence as the first gift of a general, and to place it in harmony with the increased powers of the age; nor do we trace the slightest further change in the application of its principles for the fifty years which followed the march to Marengo. The same use of them which gave Napoleon his triumph in this and in his not less memorable campaigns of Ulm and Jena, enabled the veteran Radetski—himself a learner in the bitter school of Austrian experience in the wars of the Empire—to crush the nascent hopes of young Italy in the three days' conflict of 1849. These principles applied by the young French general with an army used to

most imperfect tactics, which circumstances forbade his attempting to improve, had made him at one stroke the foremost commander of the age, and at the next seated him firmly on his consular chair; while in the glow of his brilliant fame men lost sight of the deeds of his young Austrian rival, superseded altogether in 1799 for his expressions of independence as he had been left to languish in inaction after his victories of 1796.[1]

And now four years of continental peace ensued, giving ample time for a mind less active than that of the First Consul to modify and improve all that needed reform within the army of France, and to bring that great force up to the standard of perfection formed in the ideas of the ruler. Thus we find the campaign of Ulm and Austerlitz wrought with a complete machine, long prepared to strike home with deadly effect. It was the army carefully trained on the heights of Boulogne for the invasion of England, which suddenly turned with irresistible force in 1805 upon the German Powers. But no great practical improvement recognised by French or other authorities was introduced into the imperial armies in the ten succeeding years. On the contrary, Napoleon's own well-known declaration after his fall, 'that a

[1] The Archduke Charles, as soon as he had driven Jourdan and Moreau successively over the Rhine, proposed to transfer his victorious army direct across the Alps into Napoleon's rear in Lombardy, leaving his beaten enemies to be watched by a mere cordon of posts. There has been no bolder device in strategy at any time, and its audacity probably caused its rejection at Vienna, for the Emperor had not yet been taught to be jealous of his brother's fame. But history might have had to write the events that followed with another pen had this design been carried out with as much spirit as the German campaign.

general should change his tactics every ten years,' seems to admit that no striking alteration was made in his own after this first period of undisturbed possession of the war bureau of Paris. Our inquiry, therefore, is here brought into a narrow compass, for we have only to trace out the main features of the tactics developed in the wars of 1805–6, in order to see what were the advantages in organisation of the French generals over their immediate opponents, which gave them such constant superiority at that time—a superiority which slipped from them afterwards when the stern lessons of experience had taught their foes how to imitate or excel them.

The first grand object which Napoleon held in view was to impress upon an army of 100,000 or 150,000 men the same certainty and swiftness in strategic movement or in actual conflict, which his energetic personal control had hitherto ensured with 20,000 or 40,000. This problem could only be solved by greatly increasing the mobility of such a host beyond former precedent without destroying its unity, and to this end we find him directly applying himself to the perfecting the new constitution of his *corps d'armée*. The distribution of a great force into these subdivisions, the main principle of the system being the completeness of each fraction in itself, so that, applied with its own staff, hospital, and commissariat, it might be treated as a separate army for the purposes of movement and supply, and at need united with the rest of the command for the shock of battle, is too often ascribed by popular writers entirely to Napoleon. In plain fact, however, he but borrowed it from Moreau, whose experience led him to enter

into the spring campaign of 1800 with his army divided in this new fashion.[1] The new system was but a corollary of the improvement effected in the rapidity of the movements on the field of battle by the adoption of the revolutionary column for the old 'Order' formation. Suppose the field expanded into the whole theatre of war; the change of front become a change of the army's position for some hundreds of miles; the time extended from hours to weeks; the opposed forces equal in total, but the one moving as a huge mass, the other as an aggregate of handy units, each occupying but a moderate length on a single road, and using a dozen of the latter for the march to some converging point, how apparent is the superiority of the latter for the purpose of winning the great game by the cheap process of outmanœuvring the enemy! Just by this very superiority did Napoleon master the communications of the Austrians, Prussians, and Russians in his successive campaigns of 1805, 6, and 7, when the conceptions of his strategy were carried out by an army handled as easily as a division had hitherto been. And when the key was discovered and practically used against the conqueror himself by the Archduke Charles in Austria's gallant struggle of 1809, the French still retained a fatal advantage of quickness by reason of the peculiar mode of supply which their constant wars in the enemy's territory had led them to adopt.

[1] It may be alleged that Moreau was then a mere subordinate of the First Consul; but a comparison of Napoleon's own instructions (in the volume of his Correspondence for that year) and the distribution chosen by Moreau shows the perfect independence and originality with which the general of the Army of the Rhine acted.

Much has been said in a vague way by historians of the French 'system of requisitions.' Yet by none of the writers on modern warfare whose works we have under notice, nor by any other with whom we are acquainted, is the subject practically treated, or the details made known by which masses of 20,000 to 30,000 subsisted on some of the most extraordinary marches on record. The following sketch of Napoleon's method is gleaned from pamphlets and memoirs of the time. The army being first divided into Corps, each of these divisions was placed under a practical soldier, a marshal or general, promoted specially to the charge, known to be versed in the requirements of a great body of men employed in active service. The lieutenant whom Napoleon sought for such a post might be of indifferent character as to honesty, a poor correspondent, a man incapable of comprehending the larger details of the campaign; but he must be what his Emperor termed *un homme de guerre*—a phrase implying in Napoleon's mind not merely the courage necessary to lead others under fire, and the head which could direct rightly ten or twenty thousand men in the heat of action; but the power of knowing what his troops were capable of doing and enduring, of recognising their wants, and making the best provision for these which circumstances allowed. To live among the soldiery, and to show personal sympathy with their condition as it varied from day to day with the circumstances of the bivouac or march, to communicate to his whole staff and each arm composing his command the singleness of action essential to the new system,—these were the first requisites for the ideal lieutenant whom

their great chief selected for command. To Berthier's minute care was left the regulation of the orders and returns daily interchanged. Napoleon sought his information mostly by oral means, as we shall presently see; and but little credit was given to the completeness of documents, frequency in their transmission and intelligence in the bearers being held the more valuable conditions. Thus organised, the army, which, if attempting to keep to one main road and its branches, would have dragged out an unwieldy length of several days' march [1] from van to rear, might be pushed rapidly from its base to the required striking point by simultaneous movements over as many routes as converged in the neighbourhood of the latter, and the soldiers of a corps or two could subsist on the way, where the whole mass would have starved, or been stayed until supplies were brought up.

To gather these from the territory passed through, without absolutely maltreating or frightening away the population, was the art in which Napoleon's lieutenants excelled all other generals. Their system, as improved from the blundering robbery of the ragged troops of the Convention and Directory, was nearly as follows. Each corps, when marching beyond the enemy's reach, was divided as far as the bye-roads allowed on the day's march to the designated point, and on the bivouac scattered about it in as many villages as lay near its destination. Halted for the night and the guards told off, a party from each

[1] It has been shown by calculation that the army with which Napoleon advanced on Waterloo in 1815, 124,000 strong, would have occupied more than forty miles in column of march on a single *chaussée!*

troop or company was detached to forage for the meals, and the remainder, excepting the camp guard, were employed in preparing rough shelter for their comrades, with the needful fire-wood. The foraging party went straight to their work, yet in a good-humoured way withal; and the invariable argument, 'Find us food to-day, that we may march on and leave you to-morrow,' usually saved the labour of search, and opened the stores concealed in anticipation of these dreaded visitors. Meat in some form must be found, and was found; for if the stall or fold refused to yield it, the hen-roosts of the peasant and baron were stripped. To this were generally added bread and wine, and the soldiers made the most of these, sparing for real exigency the small store of biscuit and brandy with which the foresight of Napoleon had usually furnished their havresacks on starting from the stores collected at the base of operations. The remains of the supper formed a breakfast, cooked and eaten deliberately before the next day's march began; and the evening saw the detachment some fifteen miles farther on its way in a new bivouac, where the scene was to be repeated. Such a system answered the purpose of the modern Cæsar fully for a time; but that it should be worked without great loss and suffering implied several conditions as essential. A fertile, populous country, a patient race of peasants, constant movement of the troops, even fine weather, were things absolutely necessary. The least falling off from these favourable conditions and the hospitals had at once to be formed on the way-side, and were no sooner formed than filled. A halt, when anticipated, was provided for

by the action of the Commissariat. Their duties were suspended whilst the corps was on its movement; but they were ever ready to organise their magazines and fill them with supplies by the more regular process of levying fixed requisitions in kind, or (if cities were within reach) in money to be exchanged presently for the needful food and forage. But an unexpected detention could not thus be met, and by the want of subsistence—as was once the case when the army was stopped by heavy rain on the march against Ulm—Napoleon's great movements were liable to be interrupted and his plans endangered. Nevertheless, this new method of war afforded the means of moving an army of 100,000 men under favourable conditions without magazines, and yet without positive exhaustion to the country it traversed. *Mobility*, one of the great requisites for Napoleon's strategic conceptions, was thus secured.

But *Mobility*, without *Unity*, would have led rather to ruin than success. Numerous invasions of her neighbours had already been attempted by France with co-operating armies, or with armies moving in separate columns, as wings and centre. In fact, the tendency of Carnot's later operations had been to extend, by dividing the strategic front of the forces he controlled, so as to turn the enemy's flanks; and great disasters had followed the pursuance of this system in 1795-6 by the hitherto victorious hosts of the Republic. To 'spread to subsist' would, as none knew better than Napoleon's self, be but a dangerous maxim without its complement 'unite to fight.' Therefore to secure the necessary unity the practice was introduced of a daily detailed report from the

commander of each corps stating his movements, their results, and the condition of his men. In theory at least a duplicate was sent, and in case of possible interception, a third and fourth copy. The orderly officer was to be sufficiently well-informed to give by word of mouth all such additional information as it might concern Napoleon or his Major-General to know; and, their questioning over, he awaited the return order, which prescribed with the utmost minuteness what the next day's proceedings were to be. Fully worked out, this method kept the whole army, however apparently scattered, obedient to the slightest impulse. Divested of the care of the internal details of organisation, which were intrusted to his chiefs of corps, Napoleon was able to turn the whole powers of his great intellect to the general plan of his campaign, and to direct the army, which knew no volition but that of this master will, swiftly and certainly to the decisive points of the whole theatre of war. Thus was introduced a system of combined strategy and tactics, which he himself, in words often quoted, has thus described in commenting on the great victory which crowned his first bold advance into Austria at the head of the army trained for conquest at Boulogne—a system in which the successful action was but the crowning-point of a series of long marches and able manœuvres:—'La bataille d'Austerlitz elle-même n'est que le résultat du plan de campagne de la Moravie. Dans un art aussi difficile que celui de la guerre, c'est souvent dans le système de campagne qu'on conçoit le système d'une bataille.'

With natural pride the conqueror himself regarded

this as his greatest victory. With natural enthusiasm do French historians spend their best pains in recounting the stirring tale. With natural instinct has Baron Ambert, the newest, but by no means the least important of the military writers of his nation, devoted the greater part of the first section of his work to the examination and illustration of its details. Where, if not in this the first, and yet confessedly the masterpiece of Napoleon's battles under the new organisation, shall we find the key to the train of successes which followed? 'Here,' declares the Baron in his preface, 'the tactics were perfect;' and he gives himself to their exposition with all the ardour and completeness to be expected from a trained soldier and skilled writer selected by the Minister of War for the work, aided in it by all the resources of government, and devoted to the dynasty whose empire is based on the memories of the great victory of the 2nd of December.

It has been commonly asserted that from his early use of two great secrets, *the use of artillery in masses* and *the increased employment of reserves*, Napoleon's successes in battle followed as matter of course. Baron Ambert is of a somewhat different opinion, and holds that much was due to the special tactical instruction imparted by him and his immediate subordinates to those below them down to the grade of colonel. And this thesis forms part of the groundwork of his treatment of the subject of Austerlitz, when the new mode of fighting was destined to come into open trial against the old. The victory there won was so remarkable that it may well demand an explanation more complete than that afforded by a

loose statement of Napoleon's usual mode of fighting. And without following Baron Ambert in his minute elaboration of the details, or agreeing with him in all his deductions, we would give full credit to the consummate care with which his labour has been performed. A better account of a great battle, considered as a military study, cannot possibly be expected; and to such students as would fully comprehend the essential differences between the improved tactics and those derived from the school of Frederic, this book may be thoroughly commended.

The army of France, under the new imperial system, proved itself as fit for combined and ready action in the shock of battle as for the rapid march and quick concentration which had already placed Napoleon's enemies at such disadvantage in the general campaign. Henceforth the tactics of the soldiers of Austerlitz became the chief model after which all great armies for more than half a century strove. Differences there were in detail according to national custom and habit. The Prussians refused to abandon the method which had first given their nation renown, until the system of Frederic met its final end on the heights of Jena and Auerstadt in the following year. The Russian generals have ever seemed to incline to a closer formation of their divisions than any other nation has adopted. The genius of Wellington developed an order of defensive battle (according to his own admission to Jomini) suited especially for the mixed armies he led, and founded on that marvellous solidity of the English battalions forgotten by Europe till their ancient fame revived at his touch. But an organisation by corps

—columns moving independently with connecting detachments between them, changed where convenient into lines, and covered with skirmishers to shake the enemy's order and keep him out of range—cavalry less exposed than of old, yet partly used to connect the movements of the infantry divisions and guard their flanks—reserves increased to a large proportion of the whole force, and strengthened by a powerful artillery—the latter arm greatly augmented, and placed more in mass—a careful occupation of natural obstacles in front by detachments, whilst the bulk of the divisions are sheltered where possible from the enemy's guns—such are the normal rules on which orders of battle were formed down to the time of the Third Napoleon.

Yet the influence of rifled small arms in the Crimean war must not be forgotten. Their murderous effect, as shown at Alma and Inkerman, caused the veteran writer Jomini to re-open the tactical questions which from the era of Austerlitz and Wagram had lain unvexed. His pamphlet appearing soon after the siege of Sebastopol, is prefaced with a theory on that great conflict, since strangely contradicted by American experience:—

Cette lutte gigantesque entre deux vastes camps retranchés, occupés par des armées entières, et munis de deux mille pièces de canon du plus gros calibre, restera un événement sans précédent dans les siècles passés, comme sans égal aussi dans les siècles à venir, car *les circonstances qui l'ont produit ne sauraient plus se représenter.*' (These italics are ours.)

The striking similitude of late events before Richmond to those which he described as 'never to be repeated' does not affect the truth of his subsequent

assertion that such contest of 'cannon against ramparts' have no analogy to battles fought in regular order in the heart of a continent. Indeed a fair appeal to officers who have served in open field, as well as in these weary leaguers with their changeless months of skirmish and never-ending trenchwork, would bring strong evidence to show that soldiers long employed in such sieges lose much of the quality of courage which makes them formidable in battle.

Having thus laid down his opinion that such warfare as that of the Crimea should not be looked upon as the rule, Jomini (himself, be it remembered, an officer of vast practical experience) proceeds to put the question, so vital to the infantry soldier—'Will a whole army henceforward be dispersed as skirmishers?' Doubtless he had here in mind the prophecy of Bülow, whose erratic yet far-seeing genius declared at the very beginning of this century, that the introduction of riflemen in large numbers into the line of battle would cause the latter to be broken up into a mass of tirailleurs and change the whole form of tactics. But Bülow had been a looker-on at the War of Independence in America. He had seen the fatal effect on highly disciplined troops of the fire of rifles from behind cover: and probably making but little allowance for the differences inevitable between conflicts in the tangled woods beyond the Atlantic, and battles on open or highly cultivated plains, sprang hastily to a too general conclusion in his remarkable previsions. Jomini, with fifty years' later information, and a long life devoted to the subject, delivers his conclusions thus (we omit some superfluous remarks):—

1st. 'Que le perfectionnement des armes à feu ne saurait produire un changement notable dans la manière de mener les troupes au combat, *mais qu'il serait utile d'avoir de bons et nombreux tirailleurs, et de bien exercer les troupes au tir.*'

2nd. 'Que, malgré le perfectionnement des armes à feu, deux armées se rencontrant et voulant se livrer bataille ne sauraient se fusiller de loin toute une journée; il faudra toujours que l'une des deux se porte en avant pour attaquer l'autre.'

3rd. 'Que dès lors le succès dépendra comme jadis, de la manœuvre la plus habile, selon les principes de la grande tactique, qui consistent *à savoir lancer la masse de ses troupes, au moment opportun, sur le point du champ de bataille qui peut décider de la victoire en y faisant concourir les trois armes simultanément.*'

These convictions were given to the world long before the late American war. It is surprising to see how closely they are borne out by those of Colonel Lippitt, whose little work is understood to convey the pith of the lessons gained by the experience of the Union armies in three years' constant service. So far from countenancing the idea that the superior accuracy and range of the rifle will destroy the value of Napoleon's repeated advice to his marshals, 'Carry your troops well on, and attack the enemy vigorously,' this practical observer declares (p. 7.)—

'One cause of the *indecisiveness of the results* obtained in many of the battles of the late war, as compared with the great loss of life on both sides, has been, that the opposing battalions were too often kept firing at each other at a distance, both sustaining nearly equal loss, until the ranks were so weakened as to disable either party from making a vigorous and decisive charge.'

And again at p. 12:—

'The recent improvements in fire-arms must render the fire on a close column of infantry, both by artillery and sharpshooters, still more destructive than it was before. But this sacrifice of life can be prevented to a great extent, by using the columns at a proper time and in a proper manner.'

Finally, in a section on bayonet charges, he commences with the two propositions following:—

(1.) 'When made resolutely, and *without slackening the gait*, bayonet charges have succeeded in nine cases out of ten.'

(2.) 'The bayonet is usually more effective than *grape*, *canister*, or *bullets*;'

and adduces four distinct instances from American experience to confirm their truth.

It is not, therefore, it appears, to America that we are to look for battle decided wholly by skirmishers. Although the ill-drilled lines of her volunteer battalions were often so broken from want of cohesion as almost to lose the semblance of their proper formation,[1] although her forests were, as shown before, the birthplace of that tirailleur practice now grafted on to all systems of tactics; yet the attempt to act entirely in this loose order, without regular supports, resulted only in vast and bloody skirmishes, such as

[1] To show this to be no vague assertion, the following paragraph is quoted from a recent number of the principal military periodical of the United States, the 'Army and Navy Journal':—

'An officer of experience, who was in the face of the enemy from the commencement of McClellan's Peninsular Campaign—or Peninsular failure—to the end of the operations before Petersburg—or our final success—remarks that, in actual conflict, unless our lines formed behind a barricade or protective work of some kind, they very soon resembled, as to relative formation, a "Virginia rail-fence," or a skirmish-line where squads or fours, distinct and irregularly placed, kept up relatively the direction or emplacement of a line.'

the well-known commander, General Rosecrans, termed 'bushwacking on a great scale.' Certain transatlantic writers are indeed advocates of the introduction into the national militia of some method of training in loose order; but this is on the ground of the peculiarity of their *terrain*. They admit—to use the words of one of these reformers—that 'Europe cannot do this, because the face of the old world, cleared and often unimpeded, demands the retention of old forms, consistent with its features.'

It is to Europe, therefore, to the war which in 1859 gave Italy freedom, that we must turn to see the highest development which the modern principle of advancing in skirmish order received before the breech-loader was used. We approach this part of our subject with caution, knowing that upon the use by Louis Napoleon in his campaign of the rifle, of long-range guns, of railroads, of guerilla auxiliaries, theories have been built by sanguine or partially-informed writers such as the facts by no means sustain. Two of the three chief engagements which occurred in 1859 may be, for our purpose, at once put out of sight. For at Magenta the tangled nature of the ground which the Austrians held, the uncertainty as to their position, and the division of the French columns in their passage of the Ticino, prevented any combined attack by Napoleon, and reduced his chief force for great part of the day to a simple defensive; whilst at Montebello, Forey was compelled to act largely on that principle, being very much outnumbered. It is Solferino, therefore, that, regarded in this special view, alone claims attention.

No fairer field could have been offered to the

nephew of Napoleon the Great for measuring the strength of the army so long trained in Algeria, than that which the sudden onset of the Austrians here afforded on the very ground made famous by the victories of '96. All round the base of the hill on which stands the historic tower, the Spy of Italy—with its distant views of Castiglione, Lonato, Rivoli, stirring names to a Bonaparte—the slopes, though open, are rough and broken by grassy hillocks. Partly their southward face sinks, here almost out of fire, into the famous cavalry parade ground of Medola; partly it is lost in the small field-orchards, Italy's regular cultivation, which stud the fertile plain that stretches far away to Mantua and its lakes. As the heat of the day wore on and the efforts of the defenders of the hill grew slack, it is well known that the skirmishers of Bazaine's division and of Macmahon's whole corps pressed forward in a sweeping semicircle round the southern slopes; took dexterous advantage of every object that could cover a stooping figure; poured in the biting fire of trained marksmen at every defender exposed above terrace or slope; and being steadily fed from their reserves behind wherever any gap appeared, gradually crowned the crest, leapt over the low stone walls which were their mark, and turned the retreat of the Austrian artillerymen into panic flight by shooting down the horses of their batteries. That this movement co-operated powerfully with the more direct attack on the cemetery, and the consequent seizure of the key to the enemy's position, is not to be denied. And it certainly seems fitting that the nation who first had the dexterity to seize from America the idea of the skirmisher, should

likewise be the first to bring his use to such perfection.

The capture of the hill of Solferino was the fruit of long light infantry training, improved by experience in rough Algerian skirmish, and stimulated to the utmost quickness consistent with order by the example of the dashing Zouave—the pattern of such soldiers—and by the natural intelligence of the French recruit. A debt of gratitude is due to Colonel Macdougall for that portion of his work (chap. xiii.) in which he so strongly urges that a greater rapidity of movement should be imparted to the infantry of our army, and that their drill should be modified to bring it into general harmony with that extended order which must be more and more used as fire-arms grow deadlier in their effect. That continued firing can take the place of the bayonet we have shown to be very contrary to the belief of those who have seen the latest use of both weapons in America. We may add that Baron Ambert (in the latter and theoretical part of his work) is quite as emphatic on this subject as our transatlantic authorities, or as Jomini himself. More individuality, more of tirailleur fire, more manœuvring, and that of a quicker sort, he does recommend; but he adds, that one consequence of the necessity of remaining the least possible time under the enemy's fire, and of rapid manœuvring, will be to force one of the two opposing parties to have recourse within a very short time to a decided charge or a retreat. In short, the training of infantry, it may be safely asserted, must be conformed to a lighter and quicker system of drill, though the general principles in action will remain unaltered.

Colonel Macdougall has devoted a part of his thirteenth chapter to some practical considerations connected with the proposed improvement. The subject was often in the mind of Sir William Napier, himself a distinguished leader of light infantry; and it is a fitting one for the pen of his son-in-law, who dwells much on the practice of his beloved authority in the Peninsula, and the instructions for our volunteers, which may be termed, in a public sense, the last words of the great historian. This portion of Colonel Macdougall's book may be well commended to all who desire to study the subject, and especially to those who would learn how our new legions of self-made riflemen may best be trained for service. Much there is also of value in other portions of the work, but its general design, which is to furnish a complete supplement to the author's well-known 'Theory of War,' lies beyond the scope of our enquiry. His profession, already indebted to Colonel Macdougall for his contributions to military literature, is the more so for this new series of essays, in which may be found an able defence of those military reforms which are admitted to have raised the general character of the service, though the details raise criticism from opposing interests. It is to be regretted that the work has not escaped the defect so common in its class of literature, of following too closely the authorities of the French school of M. Thiers. Exception must also be made to it as regards the promise of its title; for to the subject of Modern Artillery Colonel Macdougall has devoted but very few pages indeed of a substantial octavo. Yet the effect of rifled guns in the field is at this time a matter of as

great interest to the soldier as any that can be considered within the range of his professional study.

With regard to the new infantry weapons Magenta is admitted to have been no test, though the winning of Solferino has been claimed for the improved arm; and so is it with the rifled gun, which, as is well known, made its first appearance in the field as part of the artillery equipment of the Italian campaign. True it is that, although in the thick orchards round Magenta the new guns proved of small avail, and the trifling losses [1] reported among the French gunners showed that the French Emperor owed his first victory to other means; yet in Solferino's open ground the rifled cannon answered their projector's expectation. It is distinctly recorded that the Austrian horse-artillery had two batteries dismounted successively in a very brief space by the fire of the new pieces at a range (over 1,600 yards) hitherto quite unused in battle, and so great as to preclude a smooth-bore's reply. It is also certain that the shells which flew over the heights about Solferino and San Cassiano reached reserves of the enemy at distances hitherto deemed safe, and shook their confidence before they could come into action. But it is no less so that the cemetery wall was not battered down, but carried by direct infantry attacks, without even using the heavier guns in reserve. And even were this not so certain, the winning of the battle by this particular arm would yet have to be proved.

The question, in fact, is not whether the rifle skir-

[1] Only twenty-two artillerymen were killed and wounded in the Imperial Guard, the infantry of which had much fighting.

misher, and the long-range gun did good service at Solferino? It is this rather. Did either of these new inventions change or decidedly influence the fortunes of the day? And if this were to be answered by the verdict of the vanquished, it will be found that no intelligent Austrian officer—though admitting the value of these improved weapons—will allow any such deduction. In plain truth, the army of Francis Joseph was so miserably organised, so chance-led as to its general plan, that defeat was inevitable as soon as the battle was well joined with the enemy whom it purposed to surprise. The young Emperor, as is well known, assumed personal control, collected his huge staff to a certain point to give them orders, and then came not to meet them. It is also generally believed, and with truth, that the original disposition of his force into two armies under Schlick and Wimpffen was vicious in itself and directly conducive to disaster. But in Austria there are other strange details to be gathered. It is there stated openly, that in the Emperor's absence, his chief of staff, Hess, took upon himself to attempt a general control, and issued orders in contradiction to those of the two subordinate commanders. Finally—to make confusion worse confounded—the good old Marshal Nugent, present as a volunteer only, forgot in his excitement his true position, and commenced also to give instructions (hardly from his standing and reputation to be disregarded) to the generals of corps. These unhappy men were therefore subjected to command from no less than five different individuals; and every ill that vacillation and doubt could produce followed as of course. The divisions moved with uncertainty, or

stood irresolute till too late for their services to avail; whilst the enemy, propelled with the unity of a single will, gathered on and carried the centre of their line. Had the Austrians been armed with the Minié, had their guns been all or partly rifled, had Lauingen not carried his squadrons from the field, the result could have been no other than it was. Napoleon had concentrated three fresh brigades of the Imperial Guard opposite to Solferino at the time that it fell, for whose services he had no need to call, so completely were the defenders of the hill already overmatched. From this battle there is little to be drawn which can support the vision some writers have entertained of an army converted into a vast group of artillery, with a few supports of the other arms to guard their waggons. The authority of Baron Ambert—as we shall presently see—decisively condemns any such conclusion from the experience of the French. And so disappointing has been the experience of rifled guns in the closer fields of America, that General Grant, in very recently laying down the future organisation of the United States artillery, has directed one-half of his batteries to retain the simple smooth-bore howitzer known as the Napoleon gun!

In the concluding part of his work, Baron Ambert has very thoroughly laid to rest this vision of an army of artillerymen. He has brought together the opinions of some of the best of Napoleon's generals, to show that the exceeding weight attached to artillery in the last campaigns of the great Conqueror was a sign of decadence rather than improvement—a poor substitute for the juster proportion of arms which he had no time to create anew after the disasters of

Russia. Until guns can be served without the accompanying impediments of carriages, limbers, and ammunition waggons,—until a battery can be advanced or withdrawn over uncertain ground as easily as the company of foot or troop of horse,—artillery, though now raised to the rank of one of the principal arms, can never supersede the others; more especially as it has been shown by trial on such fairly level ground as the plain of Chalons, that the most moderate inequalities are sufficient to shelter infantry from the improved pieces at their distant ranges.

To post cannon to advantage, with due regard to their defence and the means of withdrawing them, is perhaps the most anxious part of a general's duty in occupying or attacking a position. Its difficulty is ill understood save by artillery officers, or those well trained in tactics. Hence a very frequent source of error as to the strength of positions, and one especially made as regards our late example—Solferino. The hill round the tower has been described as of great strength. It was not really so, since its crest was too narrow for the proper use of the Austrian guns, and the access to it through steep lanes so bad as to make officers unwilling to commit themselves to a defence which they feared would end (as it partly did in fact), in their finding their retreat intercepted.

Yet the change introduced by the Great Napoleon of massing guns for attack is acknowledged by all to be in the right direction. A concentrated fire is proved not only to do more proportionate damage to the enemy, but to have the effect of protecting the batteries themselves. Colonel Fremantle has taken pains to show that a similar process to the French

Emperor's was forced by experience on the artillerists of Lee in the Virginian campaigns. The improved lightness of modern carriages gives marked facilities for such combination, as the superior range now attained permits the front of the army to be swept effectually, and the enemy's columns to be taken in flank—the most formidable direction which can be used—without that subdivision of the batteries heretofore in vogue. This tendency to mass guns for a decisive stroke in battle, with the increased means of transport now available, is a sufficient guarantee that the proportion of artillery in great armies will be fully maintained, though it is not probable that late improvements will cause it to be increased.

It is more difficult to say how far the value of cavalry as a special arm of the service, may fall as artillery and infantry become more deadly in their action. As of old, so now, the moral influence of a charge of cavalry, fairly made, is very great, on raw troops especially. But both American experience, and that gained recently in Europe, point decidedly to the conclusion that the opportunities for such action as this will be very rare in the wars of the future. A body of horse presents an object so much more prominent than the like number of foot, that it must suffer, if exposed, in a largely increased ratio; whilst there is no great advance in speed to be expected beyond that attained in the early part of this century, to compensate for this fatal defect. Hence it may be asserted that this noble and attractive service must be hereafter modified in its action, remaining more carefully screened from fire than any

other part of the force engaged, and acting, on the whole, more specially as a reserve. Ney's fatal error at Waterloo proved for all time the utter uselessness of attempting to crush any part of the line of battle of a firm enemy with cavalry alone. It is not likely that his mistake will be repeated, now that the fire of a square of infantry has become vastly more effective, whilst the charge of the horsemen is in no degree more formidable. The Duke of Cambridge—no mean authority on such a point—has of late expressed publicly the opinion that heavy cavalry may, at no distant date, be found useless in the field. We trust that efforts will not be spared to make our own regiments of horse a practically equipped body, fit rather for real service than maintained for show. Such measures as these are the more necessary if we would maintain a due proportion of this expensive arm.

It is a hopeful sign of the activity pervading the whole army that such a work as that of General Smith, on the special subject of cavalry and horse artillery, has not only been published, but largely read. The book itself is so technical in its construction as to forbid its being noticed here at length. Yet its suggestions appear well weighed, and fully worth the consideration of all students belonging to these arms; albeit the most prominent of these, the practical abolition of the second rank, is one of old date, and liable to serious objections. General Smith is naturally anxious to combat the opinions which throw discredit on the future value of our horse; and he does so ably. Let officers who share this feeling take heart from the recent experiences of this arm upon the Continent, where Prussian writers

repeat the old maxim that cavalry is necessary 'to complete the victory and secure its fruits.' Whilst a horseman can go faster than a dismounted fugitive, whilst vedette and escort service can be better conducted by light cavalry than any other form of human agency, an army, to be complete, must have its share of this peculiar arm. Deprived of it even for a time, the best general may run blindly on to defeat, as Lee proved to his cost when, all ignorant of his adversary's strength, he drew near the fatal hills of Gettysburg. But General Smith and other distinguished sabreurs should use their personal efforts for the practical reform of our dragoons in equipment and drill. Let them especially get rid of such mistakes as the sham charges on a square—a folly long since condemned by that great practical tactician Marmont, and (without sufficient acknowledgment, we fear) by many another writer who adopts the criticism of the Marshal as his own.

We are brought here naturally to consider the use of one great addition to modern tactics, springing from the American war—the only special creation, as it seems, which American generals have added or rather restored to our stock, viz., bodies of mounted infantry. This arm, the original 'dragoon' of the wars of the 16th and 17th centuries, was designed originally for the purpose of rapidly marching to occupy and defend distant positions, or of outmanœuvring the enemy by moving swiftly to his flank a part of the troops apparently engaged on his front. In such a mode did Johnston, Bragg and Sherman chiefly employ their horse. By it also Sheridan (on his final junction with Grant in the spring of 1865)

bringing up and dismounting suddenly 9,000 additional men on the extreme right of the Petersburg defences, overpowered the besieged by the free use of this reinforcement, turned the detached work at first stoutly held by the troops of Anderson, won the battle of Five Forks, and finished the siege at a blow.

The restoration of the dragoon proper—a creature long extinct in Europe — is a fitting subject for military administrators to weigh. The practical difficulties which beset the attempt to create and maintain in its integrity such a force, are fully set forth by Marmont, and a perusal of his pithy remarks will at once show why it is so much harder a task among the standing armies of Europe, than with the rough farmer-troopers of Wisconsin and Illinois.

'There is (says the Marshal) a fourth kind of mounted troops, whose institution is of very ancient date, and which has, in some unaccountable manner, undergone a complete perversion: I refer to dragoons. Originally they were nothing but mounted infantry; they ought always to have retained that character. As such, dragoons might render immense service in thousands of circumstances; in detachments, for surprises; in retrograde movements, and especially in pursuits. But in accordance with the object of their institution they should be mounted on horses too small for a formation in line, otherwise the intrigues and pretensions of their colonels will soon convert them into cavalry, and they will become bad infantry and bad cavalry.

. . . . . .

'There is, I repeat, no more useful institution than that of dragoons, but then they must not be diverted from their right use. Their horses should be small, as I have already stated; their harness and the equipment of both men and horses should be solely calculated for the easy and rapid

service of real infantry, armed with good muskets and bayonets, and well provided with ammunition. Dragoons, in fact, should be clothed and shod so as to be able to march with facility.'

The increased use of fieldworks visible in the American campaigns is now admitted to be as much the consequence of the peculiarities of the *terrain* and troops engaged on it, as of the increased range of firearms. Nevertheless, the subject should not be omitted in even a summary view of the progress of tactics. In an essay[1] written before the war closed, it was shown how the woods of Virginia were intrenched by the contending armies. But this knowledge of the value of breastworks was wanting to Grant himself in his early days, as we see by his surprise at Shiloh, which a few hours' labour with the axe would have prevented. European generals can have but little experience of forest warfare. Yet the mere account of it, now familiar by report, would have sufficed to save even the slow leaders of Austria from their surprise and disgrace among the pine woods of Hohenlinden.

How easily these ready protections of an army can be improved by modern appliances and engineering skill so as to take the character of fortresses, has been remarkably illustrated by the successive sieges of Sebastopol, Düppel, and Petersburg. The Professional Papers of the Royal Engineers contain the first detailed notice of the works of the latter place that has been anywhere published. This monograph, by Lieutenant Featherstonehaugh, deserves

[1] Edinburgh Review, January 1865.

our notice for its valuable account of that system of rifle-pits, which is destined henceforward to play an important part not only in regular sieges, but wherever an intrenched position is taken up. Judging by its contents, we may believe that the younger members of the scientific corps do not intend to let its old reputation decay, or their observation lag behind the age.

In passing from the consideration of tactics and the changes that art is undergoing, it seems necessary to refute but one more popular error which has been countenanced by names lent to it with perhaps injudicious haste. It has been said that the rapid multiplying of railways and their depôts must tend to modify the conditions under which troops are brought into action. In so far as this relates to their actual collision, this is plainly an error. Cuttings, embankments, crossings, bridges, are none of them new creations. The defence of a railroad station is that merely of a building of certain size, and involves no new principles. Had the increasing wealth of civilised countries not spent itself in this way, it would have found—as it still finds—other outlets in forms of planting, building, draining, which would change particular fields of combat, but in no way affect a certain system already adapted for seizing or for maintaining a given position, or show that it could be, as a whole, altered for the better. The idea, baseless when viewed in this light, has been supported by the alleged winning of the battle of Montebello by the French as a consequence of their actual use of a railway to bring up reinforcements; and the employment of trains during a

single action has been mixed up with the general notion of the value of railroads for battle purposes. Space does not allow us to follow out the details of the affair where Forey won his reputation. It is enough to say that Rüstow (an able writer, and, as between Emperor and Kaiser, thoroughly impartial), denies in his work this pretended cause of the defeat of the Austrians, and ascribes it simply to the well-known want of resource and self-possession which has for the last eighty years constantly marked their general officers when detached. It may be added that the long annals of the American war give no reason to believe that we are near the day when commanders will arrange their order of battle with a view to bring their troops under fire by train.

Far otherwise is it as regards the greater combinations of war. The wondrous facilities which steam conveyance and the electric telegraph afford for transporting and collecting troops and supplies seem to promise almost as great a revolution in strategy, as gunpowder is admitted to have made in tactics. If (as has been shown in the earlier portion of this paper) it was mainly the change for the better in land-carriage and cultivation which enabled two minds of a different order of genius to reap suddenly, in 1796, the full advantages which a century's progress had wrought—if it was indeed the result of increasing civilisation that Napoleon's strategy ranks so far above that of Frederic, and the Archduke Charles's above that of Charles of Loraine—what may be expected when the full powers lately developed in the growth of wealth, the freedom of communication, the rapid transmission of intelli-

gence, are wielded by high ability in the interests of war? What, in short, may be read in the history of the close of the American struggle—in the utter crushing of the splendid resistance offered by the South—more striking than the lesson that the advantage of superiority in population, in manufacturing power, and material wealth is increased beyond all former belief by the new resources of the railroad and steam fleet? See, for an example, how the well-maintained lines of the Federals turned the whole tide of the western campaigns by the reinforcements brought up after the defeat of Chickamauga. On the other hand, view the impotent state of the Confederate armies for any joint operation—as for the relief of Vicksburg—when the waste of war and the strict blockade caused their roads to fall bit by bit out of repair.

The least observation of these phases of that gigantic contest, added to what we have lately seen in Italy and Denmark, is sufficient to show a great change to come in future European wars. Old lines of defence must vanish, bases formerly distant be brought near, concentration of great masses be the rule rather than the exception, months of preparation and of movement be contracted into days. As regards the strategy of purely inland campaigns, railroads and telegraphs, it may be freely assumed, will be soon so multiplied that their effect will be felt in this way wherever civilisation extends. This will be generally admitted. But it is not so apparent at first that a similar change may be expected wherever the theatre of war is open to approach by navigation. In spite of Crimean experience, and of the marvels worked

by Grant when he had once felt his way to the true use of his steam transports, few are aware how immensely the naval Powers of the world have augmented the striking force of their armies by the improvements in their fleets. France has been long the most formidable of neighbours: but it is not too much to say that her present policy of amity with England, and the undisputed rank of her navy as the second in Europe, has doubled at the very least her warlike means against the more distant Continental Powers.

Attractive as the subject of strategy is to many intellects, it is to be regretted that its study has been so limited among ourselves that its first principles have to be forced upon the public at every separate occasion. This has been partly due to the very strict attention of the best of our officers to the details of their own branches of the service—branches from which they rarely, in the scientific corps never, are removed. In the old United States army this was better managed: officers were trained more completely for the different arms; and the highest parts of a soldier's profession were not altogether overlooked at Westpoint as until recently at Woolwich. And as cabinets, however able, must generally, when entering on war, be dependent for their greater combinations on the private or official opinion of professional soldiers, it is not surprising that the views which have guided our own on certain recent emergencies have too often seemed narrow and ill-chosen. Federal generals failed at the first from want of proper material wherewith to execute their designs. Yet the early reports of M'Clellan, Halleck,

and Sherman were as broad and luminous as the proceedings of the British Government at the opening of the Crimean war were meagre and uncertain.

In our own errors we may be in some sort comforted by observing how utterly unable certain other Powers are to understand the present realities of war. The occupation of the Quadrilateral by Austria down to 1866 was simply as monstrous an error—if it really were a defensive measure—as was ever perpetrated by Mack or Weyrother. With the Adriatic open behind to a French fleet, with the neutrality of England secured, the value of the once potent line of Mantua and Verona was gone. The garrisons which could be turned by an army thrown by steam into Venetia would only be lost to the Austrian Empire. *As a base for the offensive against Italy*, the Quadrilateral was, on the other hand (as Radetski proved), simply invaluable. This was the menace against which Italy raised her monstrous army: for this all Europe was long kept in uneasiness and suspense. But the true line of defence for Austria Proper is that of her mountains. In keeping it advanced to the Po she either had secretly in view an aggressive and dangerous policy, or she was still the most shortsighted and blundering strategist of the age.

The complaint often made by English officers of the want of a comprehensive and accessible guide to the study of the higher branches of their profession has hitherto been just. The elaborate works of Napoleon, the Archduke Charles, Clausewitz, and Jomini on strategy, of Bülow, Hardegg, Decker, De Ternay, and Lallemand on tactics, would fill a library; so copious are their contents, and so laden with histo-

rical and critical dissertations. To condense their spirit and modify their precepts to suit the requirements of a progressive age, has been nowhere attempted in our language, if we except Macdougall's 'Theory of War,' a work too slight, incomplete, and unfinished—as we judge by his new publication—to satisfy the author, and yet too abstract in its method of treatment for the practical soldier. The want will be for the future in great part supplied by the 'Operations of War' of Colonel Hamley, who has used his rare opportunities so well as to take at a step the very first rank among the theorists of his profession. Though intended for the professional student, to whom its publication will be a real boon, this volume is so stripped of dry technicality, and made so luminous by the author's brilliancy of style, that all general readers who would raise their knowledge of modern warfare above that dead level implied by a trust in the gorgeous but inaccurate history of Alison would do well to see for themselves in its pages how armies are really subsisted, moved, and fought.

Englishmen, let us add in conclusion, need not be ashamed to interest themselves in the improvement of their military force. The existence of standing armies is a fact statesmen cannot afford to overlook; and our countrymen should take care that their own is neither petted into indolence, nor suffered to decay from neglect. The spirit of progress is thoroughly awakened in our soldiers. Let it be permitted to work out its honest fruits without discouragement, that the nation, grown more liberal in their treatment, may find a due reward in troops excelling all others

in skill and readiness as well as in courage and devotion. Let it be remembered that much lost ground had to be recovered in our army, due partly to a spirit of false economy, and partly to what we must hold to be the mistaken views of Wellington in his old age. During the latter years of his military rule, it is too apparent (despite of Mr. Gleig's able defence of his hero), that the dead weight of a mighty name opposed to all reform or change crushed out the active life of every portion of the service.

Even the mild and colourless *régime* of Lord Hardinge revived the military spirit in some degree. Then came our bitter lessons in the field, Varna's pestilential marshes, Balaclava's freezing heights. The nation was fairly wakened to a sense of what was due to the military service; and the work of reform began. Whether under a succession of good but worn-out warriors of the Peninsula we should have been able to show the proofs of progress which every arm now bears, is a question we will not attempt to determine here. In looking back on the former history of our Horse Guards it is plain that too many of those honoured veterans came of a school in which reform was held in odium and improvement deemed impossible. While such men held office or advised Ministers, the army fell behind the rest of the nation, and the safety of England's future was allowed to rest on the glories of the past.

Such is not the spirit that at present rules the British Army. It is not our purpose to eulogise the Prince who is at the head of the service, or to pretend that the present War Office administration is faultless.

But, on the whole, it is progressive, just, and active; and its care is felt to extend from the education of the staff officer to the teaching of the soldier's child. Under it the service has been advancing to its proper place in the State, improving in the day of rest, and preparing to answer the call for action without unreadiness or mistakes. Long may it so advance, that the soldier may find his profession honoured by his countrymen in time of peace, and that in war the national courage which bore the Six Hundred through their fierce charge at Balaclava may be guided by the science which was wanting in their chiefs. Many are the reforms that have been introduced since that sad yet glorious day; and if to impatient critics we still seem behind other nations in the march of military progress, it is rather that our neighbours have pressed forward than that we have stood still.

THE MILITARY GROWTH OF PRUSSIA.[1]

[*Reprinted from the* EDINBURGH REVIEW, *October* 1866.]

'THE peace awakens universal joy. For my own part, being but a poor old man, I return to a city where I now know nothing but the walls; where I cannot find again the friends I once had; where unmeasured toil awaits me; and where I must soon lay me down to rest in that place in which there is no more unquiet, nor war, nor misery, nor man's deceit.' Thus wrote, more than a century since, a saddened philosopher-king, wearied, as he would have the world believe, of all earthly greatness and success; and if these reflections run too closely in the vein of the wise monarch of Israel to give their author claim to originality, it must be admitted that Frederic the Great had as good reason as any one in Prussia for feeling worn out at the close of the Seven Years' War, having spared his own person as little as his suffering country. The banded powers of half Europe had not indeed sufficed to tear from him any part of his dominions, or abated a jot of his pretensions, but the realm he ruled had paid dearly for his

[1] 1. *Preussen als Militärstaat; eine historische Skizze*: Vienna, 1866. 2. *Der einjährige Freiwillige im Preussischen Heere*: Berlin, 1862. 3. *Allerhöchste Verordnungen über die grösseren Truppenübungen*: Berlin, 1861. 4. *A Military Memorial*, translated from the German of Prince Frederic Charles: London, 1866. 5. *Military Correspondence of the Times during the late Campaign*: London, 1866.

resolution. 'The nobility,' he tells us, 'is in the last stage of exhaustion; the poor man is ruined; countless villages are burnt; many towns destroyed . . . Prussia is like a man covered with wounds, who, weakened by severe loss of blood, is on the point of succumbing to the excess of his sufferings.' Yet Prussia he had not allowed to rest until the objects of the war were fully attained. Wearied out by her lengthened and gallant resistance, the enemies who had leagued to reduce her limits to the original marquisate from which she sprang, had one by one withdrawn from the strife. Last of all, even the bold Empress-Queen, who had entered on the contest determined not only to recover the province of Silesia, stolen by Frederic in the hour of Austria's weakness, but also to punish him for his personal share in opposing her imperial claims, had reluctantly resigned these objects to his fortitude, and left the real triumph of the war on the side of his exhausted but unyielding kingdom. Prussia was now the avowed rival and equal of Austria. Henceforth was established that extraordinary dualism in the government of Germany which has so powerfully influenced the politics of Europe for the past century, and ended only in thrusting out of the Empire the house which had presided over it for six hundred years, after a struggle of such dimensions as the world never witnessed save when all Europe armed to overthrow Napoleon.

The policy of aggrandisement by force or fraud which Frederic the Great had worked out in his seizure of Silesia was nothing new or original in the history of the state he ruled. The whole growth of

Prussia from the rank of a petty border state of the Empire to the strong and independent kingdom which he handed his successor, is founded on the tradition of claim followed by conquest. It would seem as though from the time when the Elector of Brandenburg, at the beginning of the seventeenth century, found his hereditary dominions strengthened by the addition of the dukedom of Prussia—an unimportant territory then in European view — the process began to which the treaty of Nicolsburg, two hundred and fifty years later, gives the crowning triumph. There is a theory favoured by many historians that the progress of empires and their decay can be little affected by the force of individual character. It may be true that revolutions are produced by an aggregate of circumstances independently of the men who take foremost place in them; but it is surely more certain that a persistent family purpose handed down from father to son in a reigning house, through ages in which the sovereign has almost absolute sovereignty, may so tone the policy of a state as to influence its own fortunes and that of all its neighbours. Why did the people of Northern Germany long since fix on Prussia as the Power round which to hang for safety, when intrigues threatened from within or an invasion from without? This land which, when first the Hohenzollern ruled it, was far more a Sclavish country occupied by a garrison of Teuton colonists than a truly German realm; why did it gradually become the rallying point for those who believed in the coming unity of the Fatherland? Why but that in the unchangeable purpose shown by the rulers of Prussia from the time

of the Great Elector to advance the bounds of their dominion, and in their earnest attention to the material welfare of their subjects, there was foreshadowed the rise of a kingdom having within it the seeds of such growth and advancement as should place those it embraced in the security which the elements of the dissolving Empire had elsewhere lost. The Thirty Years' war and its attendant calamities had, indeed, at the cost of terrible sacrifice, given freedom to religious opinion; but the smaller states of the Empire had been so enfeebled by it that their lands were offered a helpless prey to foreign invasion or to the newer civil dissensions which arose in the various Wars of Succession. French armies laid the Palatinate waste by royal decree; English generals fed their mixed levies from the fertile plains of Bavaria; Austria again and again made the western circles of the Empire the battle-ground of her pretensions; whilst the petty princes who had nominal sway within their borders could save their subjects neither by neutrality, nor by bringing their tiny contingents to join one of the contending forces. In the sufferings endured through these days, and in those which weighed more heavily still upon the minor principalities in the era of Napoleon, may be found the roots of that wish for a stronger nationality, and of the respect for Prussia as its only real representative, which have long been, in one shape or another, growing up in the German mind.

The Great Elector, Frederic William, is undoubtedly to be regarded as the real founder of the present grandeur of his successors. Under his able but despotic rule (1640 to 1688) the whole force of

Brandenburg and Prussia, now welded into one power, and much enlarged by the treaty of Westphalia, was directed to the enforcing the acknowledgment of the independence of the latter dukedom, originally held separately as a fief from Poland. His success in this was soon followed by claims on Juliers, Cleves, and Berg, skilfully urged, and boldly supported by the sword; and the limits of the dominions handed his son were thus extended from the Oder to the Rhine. Lower Pomerania had been among the additions gained in the great European settlement above mentioned; and Frederic William used the opening thus obtained to the Baltic to lay the foundation of the navy which Prussia's statesmen even thus early regarded as a necessity to her claim of a distinguished place among the Great European Powers. The same policy, doubtless, rather than a love for Austria or hatred of the Turk, led to his sending a contingent to the relief of Vienna when threatened by the Sultan in 1683.

Under his successor, grandfather of the Great Frederic and first king, the land, although ruled on despotic principles where the monarch was personally concerned, enjoyed a degree of municipal freedom favourable to the growth of the sturdy German element which was already swallowing up the traces of Sclavonic rule. His troops were in constant service as allies of Austria in her Turkish and French wars; and various small principalities, obtained as reward or purchased, swelled his now extensive though scattered dominions. The resources he left to his son, in 1713, while receiving no further additions in land, were strengthened by the care

which the new king, more than any other of this military family, bestowed on the *personnel* of his regiments, and on accumulating treasure to support the war which for his day was deferred, though his chief business seemed the preparing for it. Indulging freely his singular passion for filling his regiments with the largest soldiers in the world, the administration of Frederic William I. was in all else economical to parsimony; and without straining the resources of his five millions of subjects, he left his son, the Great Frederic, the most efficient army of Europe, to be at once the temptation and the instrument for continuing the family policy. For exercising his tall battalions in petty conquests, he had not the opportunities of his father, the first Frederic; but such gain would have given the kingdom but little new importance as compared with a step which he took in her military organisation, in which we may clearly trace the origin of her present formidable system of recruiting. In 1733, seven years before his death, the whole of his territories were parcelled out by decree into cantons, to each of which was allotted a regiment whose effective strength was to be maintained from its limits; and all subjects, beneath the rank of noble, were held bound to serve if required. With this ready instrument for supplying the losses of a war, and with an army more splendidly equipped and trained than any other of the time, his son (known then as Frederic II.) stepped into the field of European politics.

Exceeding the two former kings as much in the extent of his desires as in the ability for accomplishing them, no petty lordship, as that of Neufchatel or

Tecklenburg lately added to the Crown, would satisfy the new king, whose ambition was favoured by the stormy times in which he came to the throne. The very year in which he ascended it, saw all Germany distracted by the death of the last direct male descendant of the line of Hapsburg; and Austria herself, already weakened by long struggles against the encroachments of the Grand Monarque, and with the rights of her young queen challenged on all sides, seemed a victim ready to be spoiled. That Frederic really believed in his own pretended claims on Silesia it would be unjust to his clear sense to admit. It is better to say simply, with his latest and grossest panegyrist, that he knew what he wanted and was determined to have it. His first success only whetted the ambition of the young king-general; and Silesia once confirmed to him by treaty, he strove next to extend Prussian rule beyond the newly-gained mountain frontier into the northern district of Bohemia, where his successor's arms have lately won such signal success. Carlyle himself does not attempt to justify the greed which upon frivolous pretext brought him in arms into the coveted land when Austria seemed fully occupied with her Rhenish campaign against France in the year 1744. On this occasion, however, his strength proved unequal to the new task of spoliation. The king was fairly worsted and forced out of Bohemia by Daun and Prince Charles of Lorraine; and although the ready tactics of Hohenfriedberg and Sohr proved his increased dexterity in handling the machine-like army he had trained, he was glad to come soon to terms, and to resign the new attempt

at aggrandising Prussia upon condition of her late acquisition being left her.

The ten succeeding years were busily spent in consolidating the scattered dominions he ruled, and in constant preparation for bringing their whole resources to bear on the further struggle which he long foresaw, with its issues all-important to his dynasty. Whatever were the ostensible causes of the Seven Years' War, the real one was, beyond doubt, the resolve of Austria to check at once by arms the formidable growth of this new rival for the dominion of Germany, whose power had already so thriven at her expense. The morality of his enemies was little better, it must be confessed, at this time, than Frederic's own; but in the gallantry of his defence against the coalition which strove to destroy his young kingdom, history is apt to forget or condone the doubtful means by which its power had been built up, and which gave occasion to the deadly hostility of the Empress-Queen. Various were the changes of fortune that befell. For the next six years, as he himself wrote in 1762, 'success alternated from one side to the other.' The glories of Rosbach, Prague, and Leuthen were overshadowed by the disasters of Kollin, Hochkirch, and Kunersdorf. Frederic himself at times seemed to despair of any issue but death for himself and dissolution for his realm. Yet his boldness as a general and readiness as a tactician remained undiminished by defeat, failure, or depression. These qualities, with the excellent training of his troops, his good fortune in possessing the two finest cavalry officers a single army has ever known, and, let us add in justice to

our own country, the moral and material support consistently given by our own great war-minister, sufficed to save the struggling kingdom from the ruin that so often, during this tremendous struggle, seemed inevitable. What Prussia suffered whilst it lasted, may be conjectured from the words which we have quoted in the first page of this article from the King's own correspondence. On this subject he, above all men, would be little likely to exaggerate. Yet her position was now assured; and the policy steadily pursued for three successive generations had attained its first end. The principality, raised out of obscurity by the Great Elector, and made a kingdom by his son, was henceforth to hold a solid position as one of the first Powers of Europe, and the admitted rival of Austria for the leadership of Germany. Her land had indeed a long rest after the great strife for existence; but Frederic, whilst watching diligently over its internal improvement, took care to insure the independent position of his kingdom by refilling as soon as possible the gaps in his army. The standing forces which he maintained and handed over to his successor were little less than those which Prussia, with more than three times the resources, kept in pay before the late war; and the greatness of the burden thus imposed is better understood when it is known that the 3 per cent. of the population which under Frederic were actively kept in arms, supply under the present system the whole peace army, its additions for the field, the Landwehr of the first call, and most of those of the second—a class but rarely embodied.

On Frederic's share in the first partition of

Poland it is unnecessary here to enlarge. The number and efficiency of his battalions, with his own well-won reputation as a general, made his co-operation necessary to the chief spoiler of the unhappy kingdom, and procured Prussia the addition of two considerable provinces; whilst their safe custody against Pole or Russian formed the best reason which could be assigned for the constant maintenance of the overgrown military establishment in which her king delighted. Yet in the eastward extension of her limits Frederic never lost sight of his older objects, the advancement of her influence in Germany, and the humbling of her rival, Austria. That neither the frontier limits of the latter, nor her authority, should be extended within the Empire, were cardinal points of his policy from the time that he had forced her before all the world to surrender Silesia to his claims; and when, in advanced years, he took arms for the fourth time against her, he found opportunity not only to assert these principles, but to appear as the champion of the rights of the lesser States, threatened by the son of Maria Theresa in the matter of the Bavarian succession.

The death of the Elector Maximilian Joseph in 1777, without direct heirs, produced a complication of claims upon various parts of his domains such as even the German Empire had rarely witnessed. The Elector Palatine was at first recognised as his successor; but his pretensions were disputed by Saxony, Mecklenburg, certain minor princes, and finally by Austria herself, whose Emperor, being collaterally connected with the deceased prince, prepared (at the instigation of his mother or his

famous minister Kaunitz) to enforce by arms the rights he asserted. Frederic, either unwilling from growing infirmity to enter into a new war, or seeking to preserve to his side the appearance of moderation, engaged through the summer in negotiations; but not the less diligently did he prepare for the hostilities which in July he suddenly commenced on its becoming apparent that Austria would yield to nothing else.

The campaign which ensued deserves notice on two grounds: its marked difference of character from the somewhat reckless strategy for which Frederic had been famed; and the striking parallel which its opening affords to that of the great war of 1866; for its scene lay on the very ground where Benedek was called to oppose the recent invasion of Bohemia. In 1778, Frederic entered that country suddenly by the same means as his descendants eighty-eight years later. Like them he had an army too large for a single movement over roads so difficult as those of the Giant Mountains. His commissariat was, for that age, a masterpiece of organisation; yet he could not safely entrust to it, even though starting from provinces blessed with fifteen years of peace and plenty, the supply of 200,000 men from a single base. For this reason, more than for the purpose of defence, he had distributed half his troops, previous to the rupture with Austria, on the Silesian side of Bohemia, and half in Saxony, whose Elector was now his natural ally. One army of 100,000 men, formidable for the vigour and size no less conspicuous then than now in the peasantry of Brandenburg and Pomerania, more formidable still in their perfect

discipline and the reputation of their general, moved under the King from Glatz through Nachod and Skalitz. A second, of nearly the same strength, including a Saxon contingent, entered Bohemia by the line of the Elbe under Prince Henry, who had admirably seconded Frederic in the fiercest struggles of the Seven Years' War. The roads they followed were found open through the whole length of the passes, as open as when the Prussian armies trod them in 1866. Nachod and Skalitz were passed by the King without opposition, and the banks of the Elbe reached where the fortress of Josephstadt now commands the stream. In like manner Prince Henry moved on Münchengrätz and Turnau, his advance unchecked by a single Uhlan, and apparently unwatched. Another day of forward movement would have connected the two armies near Gitschin, important then as now for being the crossing-place of the roads converging from the passes, and 200,000 Prussians under the first general of the age would have been united for battle on the gently swelling hills which lie west of Horzitz and Sadowa. Such a movement, however, was not destined to be made; and the junction of the armies was to remain a problem even to Frederic insoluble. Rated (in Prussian history) as 250,000 strong, the Austrians, under Lacy and Laudon, were between them in a defensive position well chosen to prevent it. The design of the invaders had been sufficiently foreseen to prepare a vast line of rough entrenchments against which even Frederic's battalions might dash in vain. The Elbe, near Königgrätz, covered the right or eastern flank; the central portion followed for five and twenty miles

the higher part of the stream as it runs with eastward course after quitting the mountain chain at Hohenelbe; and from the latter place a line of hills was entrenched eastward until the Iser was reached above Turnau, whence that river made a chief part of the defence for the left or west flank, which stretched southward through Münchengrätz and the scenes of those affairs of the 27th and 28th of June 1866, which Capt. Hozier has so graphically described. The line thus held by the Kaiser's forces was nearly sixty miles long, covering a vast semicircle, each part being protected according to the formation of the ground with all that skill in the details of fieldworks which the 'Wars of Position' of the seventeenth century had made familiar to Austrian commanders. Here was indeed the strong point of their school, and in this instance their training showed to special advantage. Palisades, escarpments, inundations, redoubts, covered doubly and trebly the weaker portions of the line, and everywhere bade defiance to the attack which Frederic, after long reconnaissances, found it inexpedient to attempt.

His conduct here was, in truth, very different from that of the Frederic of twenty years before. To account for it, we may adopt either the solution of certain plain-speakers of the time, and admit that his intellect and daring were dulled by coming infirmity, or we may follow that which his panegyrists take from the personal memoirs with which he has striven (whose pen was ever as active in his own cause as his sword) to shape the opinion of posterity, and say that he believed the objects of the campaign could be fully attained without the risk and bloodshed of a great

battle. Certain it is that in this the closing military adventure of his life, he appeared as though utterly foiled by the adversaries he had so often in earlier days worsted in fair field. The next six weeks passed by, spent chiefly in sweeping up supplies from the hilly district which lay behind the Prussians between the works that stopped them and the passes; the only military operations being some unsuccessful attempts of Prince Henry's light troops to break the line of the Iser, and a movement of the King's army to its right on Arnau, as though to make a flank march towards the head of the Iser, and so unite his divided forces. The difficulties of moving the trains over the bad cross-roads impeded this latter design fatally; and food and forage being soon exhausted in the narrow slip of territory to which Lacy confined them, the first week of September found the Prussians in retreat. The King's army, having now got their backs on Trautenau, retired by the pass through that place on Landshut, whilst Prince Henry led his once more into Saxony by the line on which he had advanced.

The Imperial generals made no attempt to follow up their advantage by harassing the long trains which were with difficulty brought off over the steep roads that autumn rains had already laid deep in mire. In fact, though foiled for a time, Frederic and his army were too formidable to be lightly treated, whilst his position as defender of the rights of the minor states promised, should they be compelled into an union against the ambition of Austria, to give increased political weight to his kingdom. The Kaiser was loth, therefore, to push his late

success; and his mother, seeing plainly the dangers which lay before her son, urged him to come to terms whilst he could do so with advantage. The negotiations lately broken off were renewed with the consent of all, and soon brought to a successful end. Austria abandoned her general claims on Bavaria, receiving in lieu of them a slice of the border territory on the Lower Inn between her hereditary States and the Electorate. The latter remained under an independent line of princes; whilst Saxony and Mecklenburg were awarded compensation in money. The small though solid acquisition which the Emperor thus gained corresponded ill with the previous largeness of his claims and the success of his generals in the field; and Frederic, if losing some of his military prestige in the bloodless campaign (known familiarly as the Potato-War) of his old age, found sufficient consolation in its political results, and the admission practically made by Austria, that her imperial power had sunk into the mere presidency of a confederation. Henceforth her differences with the lesser States were, like those with external monarchies, subjects for common diplomacy rather than for Reich-tribunals and high-handed assertion. Henceforth there was recognised in Prussia a Power whose consent was a first condition for any action of Austria within the Empire—a Power to whom every element hostile to the Kaiser would rally should the constant rivalry for the control of Germany break out into open hostility.

The military force so ably used by Frederic for enlarging his kingdom's influence at the expense of Austria, was for some time employed with scarcely

less success in other quarters by his nephew and successor. Frederic William II. had not long ascended the throne when the civil war in Holland (1787) gave opportunity for the intervention of Prussia in the affairs of a neighbouring and hitherto independent state. Her well-drilled battalions without difficulty put down the popular party and restored his shaken seat to the Stadtholder; and the King had the double satisfaction of increasing the moral weight of his influence in Europe, and of asserting that principle of divine right, to him no less dear than to the first monarch of the line, or to their present successor. A more material gain was that achieved under the guidance of his unscrupulous minister, Herzberg, on the second partition of Poland. We have not space here to dwell on this, the darkest page in Prussia's history: her pretended alliance with Turkey and Poland against Russia and Austria; her use of the Swedes against the former, and of the Belgic insurrection against the latter; and the final sudden seizure, in concert with her late opponents, of the price of her double intrigues. Dantzic and Thorn, districts long coveted, as including the mouths of the Vistula, were the price of her complicity in this last spoliation, which was carried out with even more of diplomatic fraud than that in which Frederic had shared. Necessity, 'the tyrant's plea,' is the only justification which Prussian historians can offer for this stain on the annals of their country. To this day the wounds thus inflicted on their weaker neighbour remain unhealed, and influence for evil the foreign policy of their land.

Imitating his predecessors as well in the personal

administration of domestic affairs as in their foreign policy, Frederic William was the unconscious instrument of restoring to his country's service one destined long after the King's decease to add new glories to her arms. Passing through Pomerania on one of his provincial tours, his attention was excited by the fine horsemanship of a country gentleman who rode a steed such as none of the royal suite could match, and evidently sought his notice. Blucher—for it was no other—had been dismissed by the Great Frederic from his troop of cavalry fifteen years before, for hot remonstrances at a promotion made over his head; but the dashing hussar had never fairly been reconciled to his civilian life, though seeming to follow its pursuits with energy. Inquiry on the King's part led to interest in the ex-officer, and, not long after, to his restoration to the service with the rank of major; and the service was thus provided with a leader for its squadrons fully able to maintain in the long wars to come the prestige established in Frederic's days by Ziethen and Seidlitz. No other army has been so fortunate as to produce within half a century three such matchless generals of cavalry as these.

The intervention of Prussia in the affairs of Holland had not long ceased to excite the observation of Europe, and the partition of Poland was still unaccomplished, when that mighty storm arose in the West which was destined for a time to extinguish the rivalries and animosities of German Powers in their general humiliation, and to school them by common sufferings, by common hatred and fear of a foreign foe, into the Union which has just been dis-

solved after fifty years of life. The ancient empire of the Kaisers was to be laid prostrate by the blows of republican armies; the strong northern kingdom got together with so much care and energy by the Hohenzollerns, to be brought lower still, and for years to bear the chain of the victor. A new general and a new system of warfare were to eclipse the achievements of Frederic, and to confound the armies he had trained. A bolder and more unscrupulous diplomacy than the Great Elector's was to change the whole map of Europe and to remove her most ancient landmarks. The Revolution came, and Napoleon; and the dial of Prussian progress was put backward until their final overthrow.

Herzberg, the able minister to whose care Frederic William left his foreign affairs, was for long unwilling to take any decided step against the new order of things in France. Prussia had as yet barely eight millions of population scattered over very divided territories. Her army, though inordinately large for defence, was yet insufficient to undertake singlehanded that invasion of her dangerous neighbour in which Marlborough, wielding far greater resources, had failed; and, moreover, it would soon be needed to secure further acquisitions on the Vistula. An alliance with Austria against the Revolution promised immediate advantage only to the new emperor, whose Belgic possessions had but recently been brought out of the rebellious condition in which Joseph II. had left them, and were laid open, in case of hostilities with France, by the dismantling of their fortresses. Not until the sacred rights of kings were attacked in the person of Louis XVI. after his

flight to Varennes did Frederic William move to the rescue. Then, indeed, he roused himself from what for a Prussian monarch was almost an indolent life; mingled personally in the diplomacy of the time; brought on the famous meeting at Pillnitz (August 1791); and prepared to join Leopold in the armed intervention which the temporary release of the French King deferred until the following summer.

How great the influence of Frederic's name was on the armies of that age has been shown in the Essay which precedes this. His instructions were held to teach the perfection of tactics. His administration was copied servilely in its details, though its spirit had fled with the author. His generals, however old, were deemed of necessity masters of their art. It is not surprising that the Germans saw their emperor's troops moving for the first time under a Prussian commander; nor that the force which entered Champagne in 1792 was deemed by friends and foes irresistible because in the main composed of Prussian battalions. The new French levies had failed disgracefully in their first attempts against Belgium; and the emigrants who crowded into the allied head-quarters seemed not too sanguine when they promised their new allies an easy march into the rebellious capital which had driven them forth.

The arrival of Frederic William in Brunswick's camp was the signal for the advance, and for the issue of the boastful proclamation against the Revolution and its abettors, which, more than any other event of these strange times, threw absolute power into the hands of the reigning faction that embodied

at Paris the terror, wrath, and energy of the threatened nation. How completely the undertaking of the allies broke down in execution it is needless to repeat here at length.

The Prussian staff, relying too much on the promised support which they nowhere met, threw aside the prudent but cumbrous arrangements of magazines by which Frederic had always prepared for his offensive movements; and their troops, plunged into an inhospitable district in unusually bad weather, perished by the thousand for lack of supplies. The sickness that ensued, and the unexplained vacillation of the King or of Brunswick at Valmy,[1] proved the ruin of the expedition, and the turning-point of the Revolutionary War. Thenceforth the Republican armies grew in *morale* as rapidly as in numbers, and a system of tactics was gradually formed by their generals, destined to replace that which Frederic had bequeathed to Europe, and brought to its perfection under Napoleon's master-hand, to overthrow the troops of each Great Power in turn. The failure of the Prussians in their campaign was as great a surprise to Europe in 1792, as the sudden collapse of the Austrian army in 1866. Goethe, who was in the camp on the morrow of the battle of Valmy at once discerned, with instinctive sagacity, the change which had occurred in the forces of the world.

[1] M. Mortimer Ternaux, although he has written a very interesting volume on this portion of the Revolution, and searched out many original authorities, has done little to explain why the action of Valmy was allowed to end in the cannonade with which it began.

Humbled bitterly by the disastrous result of Brunswick's expedition, the King of Prussia measured more truly than before the real strength of his kingdom, and repented of the temporary adhesion to Austria, in seeking which he had completely turned aside from the policy of his ancestors. Personal honour was, however, too deeply pledged to admit of his at once retreating from the alliance he had sought, and which appeared strengthened by the declaration of England and Holland against the Republic. Therefore through the long bloodshed of the following years Prussian armies were engaged on the side of the Coalition; but the latter profited little by their aid. Europe watched with surprise a Power which had been deemed the most warlike of the century, conducting its share of great campaigns in a manner so feeble as to make even the poor strategy of Coburg and York shine by comparison. To this day Austrian writers allege, and with good show of reason, that the defeat of the invasion of Northern France by those generals in 1794, and the subsequent loss of Belgium and Holland, were owing far more to the difficulties entailed by Prussian lukewarmness than to differences between themselves or the superiority of the enemy's manœuvres. These disasters were, however, a powerful motive for Frederic William's withdrawal from a struggle in which there was now nothing for Prussia to gain, and which had brought a victorious enemy to the borders of her own western provinces. Ever since his first enthusiasm for the vindication of outraged majesty had passed away, the half-hearted nature of his alliance with Austria had produced

increasing irritation in the correspondence of their diplomatists; and he seized gladly the excuse offered by the insurrection of the Poles under Koschiusko in 1794 to withdraw his forces from the Coalition. The treaty of Basle soon followed, and Europe saw with dismay the great German Power whose arms forty years before had defied France leagued with half the Continent, now admit the claim of the aggressive Republic to advance her frontier to the Rhine. Austria's cause was weakened further than by a single secession. Bearing steadfastly in mind his family policy of rivalling the Kaiser in German allegiance, the King of Prussia offered a guarantee of neutrality to any States of the Empire which would join him in retiring from the contest; and many of their petty princes were thus carried off, to be followed later by others when Austrian arms met with further reverses.

The conduct of the war that Prussia thus relinquished had dimmed her former fame no less than the peace that closed it; yet no administrator rose at this time competent to point out the causes of the ill success which had invariably attended her arms save where bold Colonel Blucher, with his cavalry (aided sometimes by a small force of infantry), harassed the enemy's outposts. This officer from the beginning of the war showed such capability for detached service as marked him for future employ in higher grades, and made his name familiar to every man who served in the armies before which he held watch. His activity was, however, exceptional; and the chief commanders illustrated every degree of military imbecility, whilst their troops retained only

the form of the battalions of Frederic, the soldiery that formed them having fallen off from their model in every quality but stiffness. In spite of the severe system of conscription by districts, enforced by every penalty which the law could employ, a trade in permits for absence had long been established as a perquisite of the captains. Those who could pay well for the exemption were thus allowed to escape the allotted service, the bribes received being used in part to attract an inferior class of recruit to fill the ranks of an army which an iron discipline maintained in every detail made thoroughly distasteful in time of peace. Composed thus of indifferent material, brought together by a system of corruption, the companies were as ill commanded as formed. The captains and subalterns had served long with but little experience of war; and as a class had neither youth, hope, nor love of the profession which had become with them a mere trade. The higher posts of the staff were filled by veterans who were known merely as commonplace men who had served with Frederic, or by scions of certain princely houses among the minor States which Prussian policy strove to win. So trained, so enlisted, so officered, the army which had once been acknowledged the first in Europe was now behind others in fitness for the field. It was especially ill suited to meet the growing enthusiasm of the French soldiery, whose ardour, springing from political fanaticism, was sustained through the sternest want by the hope of professional advancement. The military prestige which had been handed down to Frederic William suffered therefore in this war against the Republic no less than the political

influence of Prussia by his useless intervention and the inglorious peace which followed it.

His son, Frederic William III., succeeded in 1797 to the throne, which during his tenure was to know the greatest vicissitudes that modern history records. For nearly ten years he steadfastly maintained the policy bequeathed him; looking on with contentment at the repeated humiliations of Austria, and viewing in her losses the future gain of his kingdom. At length the time had come when this fatal neutrality could no longer serve the Court of Berlin. Russia had combined with Austria to check the growing power of Napoleon; and the rival emperors from East and West sought a passage for their legions through the straggling dominions of the Hohenzollern. What was refused to the Czar was forcibly taken by his opponent; and the march of Bernadotte through Anspach on his way to Ulm and Austerlitz produced such a fever of popular indignation through Prussia as shook the royal power, and showed alike the strength of the national feeling which had been roused in the whole German race by the progress of French influence within the Empire, and the necessity which henceforth lay upon the King to follow a policy more conformable to the wishes of his subjects. The visit of Alexander to Berlin was naturally followed by the withdrawal of the French agent Duroc, and Napoleon was exposed to the prospect of finding the Prussians descending on his communications in conjunction with the allied corps which English means had brought together in Hanover. The sword of Brandenburg, in this hour of trial, proved rusty in the scabbard, and the main-

tenance of an overgrown standing army to have taxed the kingdom's strength without fitting it for ready defence. Before the needful preparations for taking the field were made—before the last vestige of the King's vacillation had been swept away by the entreaties of queen, ministers, and people—the great adventure of Austerlitz was made and lost by those who had grown tired of waiting for Prussian aid. 'Fortune has changed the address of your letter,' said Napoleon, when receiving the congratulations of Haugwitz, the Prussian envoy; but contented with sarcasm for the present, he deferred his revenge, and even feigned reconciliation and friendship. On December 15, the day that Frederic William had fixed for declaring against the French Emperor, his ambassador accepted at the latter's hands the gift of that coveted land of Hanover, which now, more honestly won, extends the limits of the once petty marquisate from Russia to the German Ocean. Haugwitz's master was scarcely ready to adopt the bold measure of annexing without provocation the territory of an old ally; but Napoleon's instances soon compelled him to decide to retain the spoil thus offered, and openly declare to the world his acceptance of the Electorate as French spoil of war.

The degrading acquisition was not long destined to reward this public avowal of treachery. Scarcely had the indiguant fleet of Britain swept their new enemy's flag from the ocean, when Europe saw it raised by land in a brief struggle against the victorious legions which Frederic William had vainly sacrificed his honour to propitiate. The bribes of Napoleon Prussia found to be no free gifts. Bavaria

was enlarged at her expense; Cleves and Berg were surrendered to make the despot's brother-in-law a new duchy; fresh humiliations were heaped on her by French administrators from day to day. From the rank of a Great Power she found herself suddenly fallen to the condition of an appanage, and her monarch treated as a vassal. Yet she had made no struggle and suffered no defeat; had looked on unscathed whilst her neighbours bled; and now, waiting for their loss to make her gain, found herself isolated, exposed, humbled without pity—a warning for all time to statesmen who make traffic of neutrality. If the Court could endure this, the people would not. Alike the noble, the burgher, and the peasant felt the warlike thrill rush through them; and that tempest of passion swept over the nation which is to individual fury as the trampling of a multitude to the footfall of a man. Without counting the cost or measuring the odds—without waiting for the aid of Russia, still hostile to France—Frederic William was forced into the struggle he dreaded, and Prussia single-handed faced Napoleon and his vassals. Planted already by Bavarian permission within easy distance of the decisive points; armed with the might of superior numbers,[1] long training, and accumulated victory; led by a chief whose bold strategy had not yet degenerated into limitless waste of men's lives, the French rushed on to the flank ex-

[1] French historians (repeated too often by English writers who should have more care for truth) would make the Prussian forces that met Napoleon to number more than 150,000, against his admitted 190,000. In fact Prussian authorities show that less than 120,000 men were on their side collected for the actual shock upon the Saal.

posed by the rash ill-guided advance of their enemy. Jena was fought and won almost within sight of the little hill of Rosbach, which had given name to their defeat half a century before; and Frederic's victory was avenged tenfold by the battle which laid Prussia prostrate at the conqueror's feet.

With a rapidity of which even Napoleon's troops were scarcely thought capable, the kingdom was overrun, the remains of its army annihilated, its cities occupied. The hollowness of its military condition was manifested alike by the evil condition of the fortresses and the fate of the columns. Blucher, indeed, fought fiercely to the last; but with this, and two other less noted exceptions to the shameful imbecility of the commanders, generals and governors seemed to vie with each other in surrendering their posts with the least effort at resistance. The servile worship of Prussian models, which had prevailed through the armies of Europe, was changed into a contempt as ill founded as the opposite extreme; and the officers whose system had so long been copied were now denied[1] even the common attribute of physical courage which soldiers are in general ready freely to accord even to the fallen. Yet the last struggle of the King and the remnant of his forces by the side of the Russians in the spring campaign of 1807 showed gallantry of which their ancestors might have been proud. Reduced as Frederic

[1] Expressions of contempt for the personal conduct of Prussian officers abound in the works of the time. It is sufficient here to point to those in the posthumous 'Memoirs' (vol. ii.) of Sir R. Wilson, printed from his entries made in Poland in 1807. Yet this same officer lived to witness at Bautzen and Leipsic the magnificent valour and good generalship of these once despised allies.

William was to a single city and a few square miles of his dominions, he refused to submit to the harsh terms required of him whilst a gleam of hope was left. His troops gave valiant and timely support to their allies on the bloody field of Eylau. It needed, in fine, the fearful mistake of Benningsen at Friedland, and the disgust of Alexander at the disaster and subsequent retreat, to bring about the abandonment of the unhappy kingdom which followed on the celebrated armistice and interview of Tilsit.

Stripped of half her territory, the rest a mere field for French tax-gatherers, or exercise-ground for French troops, the policy of Prussia for the next six years to the outward world seemed to consist but in different degrees of servility to the master whose chains she had no power to shake off. Her revenues were swallowed up by foreign exactions; her army reduced to a mere corps by the decree of Napoleon; her means of rising against the oppressor seemed hopelessly gone. Yet there were those among her statesmen who never lost sight of her past greatness, and in these hours of darkness strove to fit her for a better destiny than that of a vassal province. Stein, her great minister, laboured indefatigably to prepare her recovery, by raising the legal condition of her peasantry, and breathing into them the spirit of patriotism through measures of domestic reform. Scharnhorst gave no less efficient aid by devising the system of short service in the regular army, with a constant supply and discharge of recruits, on which the existing organisation rests, and which gave, in 1813, to the allies four times the number of soldiers which Prussia had nominally counted. Patiently these

great men bided their time, unmoved by the presence of calamity or by the dangerous ardour of such men as Blucher fretting himself into illness in his inaction, and Schill, the gallant major, who rode forth with his squadrons to declare for freedom and meet death unflinchingly in the hope that all the chivalry of Germany would follow his devotion. They watched grimly the effect of the exactions of Daru, the brutal violence of Davoust. They saw the Tugendbund spreading its branches even through the very courts of princes who seemed true vassals of Napoleon. At last came the hour of his defeat, and Prussia's opportunity lay before her.

At first the King would fain have temporised. The conduct of York in abandoning the French side in Russia was disavowed; the general himself was spoken of as a traitor; a court-martial was promised as his reward. Then came, however, a torrent of popular feeling such as no nation in modern Europe, save the French in 1792, has ever known. By one far less the King had been urged on, in 1806, to his fatal war. By this he was fairly swept away; and, his choice once made, boldly and wisely he pressed on to head the new movement which no government could have stayed. Blucher came forth from his retirement, and all eyes turned on him as the fit representative of the leading passion of the nation. None of her soldiers had so openly cherished his hatred of the enemy, his hopes of revenge and triumph. The command of the chief army fell naturally to his hands, and a staff was formed for him, skilful to guide the sharp sword he drew and to control the heat which might have exposed his force

to danger. Disaster and suffering had been no less useful in schooling Prussia's army than her people for greatness. Her infantry had been trained to a light, mobile system of tactics, modelled on Napoleon's; their weapons modernised after the fashion of his army's. The upper ranks of each department were now filled by men chosen solely for their efficiency. England supplied the material wants of her soldiers. Russia placed corps of veterans beside the raw troops which swarmed voluntarily to the standards. A long year of struggle and victory bore these once dishonoured ensigns into Paris. Another had scarcely passed away when Prussia was seen in the van of all Europe, striking a second time from his throne the general enemy. Let those of our countrymen who think of 1806, recall with it the June afternoon of 1815, when our fainting line, weakened by the defection of half-hearted auxiliaries, looked and looked not in vain for the promised attack upon the flank of the foe, which was to give the Allies the completest victory that modern history records.

In proportion to the greatness of her sufferings and the magnitude of her efforts against the oppressor, was the reward that Prussia reaped on the new partition of Europe. Recognised once more as one of the Great Powers, and the equal in all but nominal rank of Austria within Germany, she was no longer left with boundaries so ill-defined and broken as to call for constant preparation for war to maintain her security. Saxony paid dear for her firm adhesion to Napoleon; and the half of that kingdom, with considerable additions in Westphalia and the Rhine

provinces at the expense of petty princes who lost their thrones, gave Prussia well-marked limits, extending (save where divided by Hanover and Hesse Cassel) from the borders of Russia to those of France, with a population large enough to furnish without strain a standing army proportioned to her position. Such a provision was not, however, sufficient for the designs of her rulers. The presidency ceded to Austria in the new German Confederation, in virtue of her old imperial claims, was from the first distasteful to her former rival. To restrain its authority within merely nominal limits being still, as under the Empire, a cardinal point of the Hohenzollern policy, a force was determined on as the future defence of Prussia, which, without crushing her resources, should, in case of need, give her military power beyond the natural importance of her territory. A foundation for this future system had been already laid by Scharnhorst during the years of her subjugation; and, from 1806 to 1813, the actual service had been made but six months, with frequent calls of recruits succeeding each other in the ranks, and thence returning to their homes to form part of the militia, so as to spread through the suffering nation a general knowledge of arms against the day of need.

For the ease of conscription, Frederic William I., father of the Great Frederic, had (as before shown) divided the country into certain recruiting districts allotted to the regiments. To this arrangement, on which the landwehr system is still based, Frederic added certain further improvements; the chief being to distribute the various arms in due proportions over

the respective districts, so as to make the force of each province independent in itself; and to abolish altogether the procuring of recruits from the neighbouring States, a practice much resorted to until the close of the Seven Years' War. The latter measure gave the Prussian army the strictly national character it has ever since maintained; the former prepared the way for the raising it by separate corps, each complete in itself, and capable of being put upon a war footing by the resources of the province. The materials of the patriotic army which Stein and Scharnhorst created were therefore ready in great part to their hands, and the feeling of the people did the rest. The bands of paternal government were, however, sensibly loosened by the presence of the foreigners who held all Prussia in their grasp; and her great minister took the occasion to encourage her sons in a spirit of national self-sacrifice by vast and far-reaching political reforms. The remains of feudal servitude were abolished. The peasant might in future hold and inherit land in his own right. The towns received increased political privileges. Taxation was made alike for all classes, and civil office thrown open to every native. The country during this period of apparently hopeless prostration made a vast political advance in its inner life; and though much of this liberal policy was reversed in the days of the Holy Alliance, enough remained to cause Prussian administration to be envied in the minor States, where the government, conducted by the caprice of the prince, made its despotism personally felt by changeful and petty interference with the subject. The immediate effect of Stein's reforms

was a vast increase of national spirit and strength. The military service of the country was accepted by all without reluctance in tacit preparation for the day of reckoning with France; and the struggle of 1814 once over, the minister was encouraged by all classes to bring forth a complete project for the perpetuation of the system which had restored glory and freedom to his country. The foundation of the permanent constitution of the national force was laid by the remarkable law of September 3, 1814, which for more than forty years was the charter adhered to by the Government as binding on both sides, and which in its introduction is declared to be the product of the wishes of the whole people of the land.

'In a lawfully administered armament of the nation lies the best security of lasting peace,' is the principle proclaimed as the groundwork, together with the more immediate necessity of maintaining intact by the general exertions the freedom and honourable condition which Prussia had just won. All former exemptions from service in favour of the noblesse were from this time abrogated. Every native of the State, on completing his twentieth year, was to be held as bound to form part of her defensive power; and it was only with a view to the avoiding inconvenient pressure on the professional and industrial population that the armed force was to be composed of sections whose service should lessen in severity as their years advanced. The whole system comprised (1) a standing army; (2) a landwehr of the first call; (3) a landwehr of the second call; (4) and the landsturm. The constitution of these forces was laid

down in detail as follows, and is still adhered to in principle, though altered in certain particulars to be hereafter noticed.

The standing army was to be composed of (1) volunteers desirous to undergo the necessary examinations for promotion with a view to adopting a regular military career; (2) of men voluntarily enlisting without being prepared for such examination; and (3) of a sufficient number of the youth of the nation called out from their twenty-first to their twenty-fifth year; the first three years to be spent by these latter actually with the colours, the other two as 'reserved' recruits, remaining at home but ready to join the ranks at the first sound of war. A further and most important provision allowed 'all young men of the educated classes, who could clothe and arm themselves, to take service in the rifle-corps and other light infantry; and after completing one year at their own expense to receive furlough to the end of their regular call, upon application.' This rule was, no doubt, introduced to save the wealthy and wellborn the degradation which, in a country essentially aristocratic, the mixture in a barrack-room with recruits of the lowest classes would necessarily imply; and there has since been built upon it, during the past half-century, the elaborate system of *Einjährige*, or one-year volunteers, which has solved at once two difficult problems. The universality of the conscription has been maintained without open opposition from that important middle order, the wealth and influence of which have grown in Prussia as much as in any part of Europe, and which, notwithstanding its claims, is excluded from the higher posts

of the army; while a body of efficient officers, trained in all the duties of the line, has been provided for the staff of the landwehr without expense to the State. The process by which the latter object is accomplished will be traced hereafter. The regular organisation of the militia under the same fundamental law is first to be described, together with its special duties.

The landwehr of the First Call was designed for the support of the standing army in case of war, and was liable to serve at home or abroad, though in peace only to be called out for such exercise as is necessary for training and practice. It was formed (1) of all the young men between the twentieth and twenty-sixth year who did not serve in the standing army; (2) of those volunteers who had been trained in the light battalions; (3) and of the rest of the male population up to the end of their thirty-second year, excepting only those who had sooner completed twelve years in this reserve and the army.

The landwehr of the Second Call was intended in case of war either to strengthen the garrisons and garrison battalions by detachments, or in special need to be used in its entirety either for corps of occupation or reinforcements to the army. It consisted of all who had left the army and the First Call, and of any other able-bodied males who had not yet entered their fortieth year. Such cases included men who have begun the line service (as is permitted if the bodily strength be found sufficient) before the twentieth year, and thus been the earlier discharged their attendance on it, and their seven years in the First Call. The drill of the Second Call was in time of peace only for single days and in their own neigh-

bourhood; and facilities were provided for their changing their residences and enrolling themselves in the nearest regiment to their new domicile.

The landsturm was only to be called out in provinces of the kingdom actually invaded, and then must be summoned by a special royal decree. It was, however, liable to be employed by the government for the support of public order in special cases. It was to include (1) all the men up to the fiftieth year who are not regularly allotted to the army or landwehr; (2) of all who have completed their landwehr service; (3) of all the youth able to carry arms who have attained their seventeenth year. It still consists of civic companies in the larger towns, and of local companies formed in the smaller towns, villages, and open country, according to the divisions of the districts for other governmental purposes. No provision, it should be remarked, is made for the exercise of these companies, which have in fact existed only on paper.

Further sections of the law direct the exemption (under careful restrictions) of candidates for the priesthood, and lay down certain additional principles. The most important of these is the declaration that the normal years for entering and leaving the standing army and reserves are valid only in time of peace, and in case of war may be altered so as the better to fill the gaps in such sections of the forces as are called under arms. All volunteers for the standing army have the option of choosing their own branch of the service. Soldiers who desire to re-enlist for a second term after the completion of their first three years, are to bear a distinguishing mark; and after

a second re-enlistment are to receive a higher rate of pay, and the right to pension in case of being invalided. Similarly, those who desire to prolong their service in the First or Second Call might do so, and are entitled to bear a distinguishing mark, and to have a claim to higher rank in the regiment or company of the reserve thus selected, according to their qualifications. A special committee, composed of a military officer, a civil magistrate, and a local proprietor, was created in each district in the kingdom, to watch over the details of the administration of the recruiting within its limits, and to see that it is conducted with order and justice.

Such were the principal provisions of the law which the War of Independence bequeathed to Prussia. For more than forty years the compact was fairly maintained, although other legislation of the Stein Ministry suffered terribly at the hands of the reactionary party, which rioted in all the Courts of Europe after the final fall of Napoleon. The people remained contented with the military administration, which was supported by a budget moderate for the resources of the country. 130 battalions of the line, 152 squadrons of cavalry, 112 companies of artillery, and a slender proportion of engineers formed the standing army. The exercise of the landwehr was of very moderate extent, and their only permanent staff consisted of a commanding officer and adjutant for each of the 116 battalions which were enrolled in the First Call. The *einjähriger* service of the line had been taught to supply the rest of the necessary officers; and although now recognised as a special personal tax on each male of the better class, the

lightness of its practical working had (as before intimated) reconciled the majority to a system which would otherwise have been unendurable in time of long peace, contrasted as it was with the commutation of the conscript's service into a fine, practised in the neighbouring territory of France. The operation of the law and its results must now be more closely looked at.

It will be seen that no specific provision had been made for filling up the commissions in the standing army. The original exemption of the order of nobility from the conscription by Frederic William I. almost implied that many of this class would enter the service as officers. Practically no one of lower rank was considered eligible, until the War of Independence; and although the legal privileges of the nobles were then abolished, the system which was established has continued to the families which during the previous century had made arms their profession a monopoly of the upper ranks of the service. Any young man of means might indeed enter himself as a volunteer and pass the necessary examinations before his year was expired. This qualification and that of a university degree (a far more general possession in Prussia than in any other country) would give him the legal right to apply for an ensign's commission. Here, however, his prospects would end. The coveted appointment, which in England is the direct gift of the Crown, and in Austria of the honorary colonel of the regiment, is here subject, though nominally conferred by the Government, to the approval of a standing committee of the corps, whom the candidate must satisfy not only as to his

professional qualifications, but as to his parentage and means. This committee has in fact just that power of rejection on personal grounds which custom has accorded the colonel in our own household regiments of cavalry; and the result has naturally been to make of the service the closest corporation which any profession in the world can show. Many of the noble families of Prussia are almost without means except as they may find them in the public service; and since the civil bureaux have been thrown open to other classes, the aristocracy are all the more tenacious of the supposed hereditary right of their order to the officering of the army. It should be added that a large part of the first commissions are given by the Crown, independently of these rules, to cadets who have completed their education at the royal military schools, and that the tendency of late years has been to increase this proportion, and thus make the upper ranks of the army more directly dependent on the king; but as the late monarch and the present have habitually leant for support on the nobles as against the trading classes, it is not surprising that the officers thus appointed from institutions entered solely by royal favour, are as separate from the bulk of the people as the rest of their cloth. From the working of this system it has followed, that not more than a twelfth part of the officers are of the middle orders. The Prussian military aristocracy have among them some men of local influence approaching that of the great families whose names from time immemorial are known in the service of Austria, men who, though loyal by descent, have other interests than those of the Crown. These,

however, are the exceptions in a class composed too greatly of a needy noblesse, depending on the Crown for all hope of advancement, separate from the people by birth, habits, and profession, and apt in their self-assertion to increase, by offensive personal bearing, the distance which, in Prussia more than in any other country, divides the man of arms from the civilian. It needs no prophet to foretell the difficulties which this system will produce in revolutionary times. The endurance of such a military caste as has been described can only co-exist in modern society with the necessity of having constantly in view the use of the army against foreign enemies. Should Prussia's external horizon become clear, the first reform demanded in her domestic administration will be again, as it was not long since, the assimilation of the officering of the standing army to that of the landwehr; whilst the contempt with which the aristocratic soldiers of fortune regard all civil interference with their profession will tend greatly to precipitate a collision between crown and people.

From what has been said it will be seen that for all martial ardour in the middle classes of this great military people, there has been no outlet for the last fifty years but the landwehr service. Promotion from the ranks of the line in Prussia, in the sense in which it is understood in our service and that of France, is a thing unknown. The actual performance of a private's duty, by which a reformed scamp often in the English army, an intelligent middle-class conscript much oftener in the French, wins his way to an officer's epaulettes, would never be the path selected there; nor would such temporary degrada-

tion (as Prussian opinion would regard it) be considered as a claim for advancement even in the landwehr. Here, indeed, the commissions are laid open without distinction of class, and the officers who hold them are a truly national body; but the preparation for them still requires considerable means and much pains, it being solely through the *Einjährige* that its vacancies are filled up; while the system is worked so carefully that only those who have really a love for the details of the profession, and ability to master its theory, are finally selected out of the vast mass of unpaid volunteers who every year attend the colours. As a necessary consequence of the growing wealth of the trading order, the number of these has annually increased. The Government has done all in its power to encourage a feeling which has added constantly to the number of its intelligent defenders without swelling its military expenses; and it has long been a regular part of the education of the son of every manufacturer, proprietor, professional man, even of every well-to-do shopkeeper, to spend one of the three years between his seventeenth and twentieth birthdays in passing through his volunteer course. How greatly this differs from the idea of 'serving in the ranks,' as service is performed in other armies, will be best seen by following out in detail the life of the young *Einjähriger* on entering his new condition.

Quitting his college, or counting-house, or home, he arrives at the head-quarters of the department to claim the right to take service as volunteer. A commission sits twice a year for a month each time to issue the necessary documents; and to this the

candidate has already made his application in writing, supported by certificates of his birth, of the consent of his guardian to supply the necessary expenses, and of his conduct and attainments from his school or tutor—on which latter, be it noted, the insertion of any punishment for dishonourable conduct is fatal to the application. If these papers are all in due form, and properly attested, the certificate is granted at once, after a brief physical examination by a medical officer, to candidates from the universities, first-class royal schools (of which there are more than sixty in the kingdom), and certain second-class schools specially authorised; the commission seldom exercising the right, which in theory at least it possesses, of testing by written papers the candidate's knowledge. Indeed with this description of applicants a personal appearance may be dispensed with, at their own risk should the papers (including proof of physical fitness) be found in any way incomplete. With the considerable class, however, who have not been educated at the prescribed institutions, an actual examination follows. The commission (consisting normally of a staff-officer, another military officer, and two civil officials of the department) calls in two or three extraordinary members from the heads of the nearest government college, and tests the candidates in their scholastic knowledge. German, Latin, French, mathematics, geography, and history, and the elements of natural history and physics are the prescribed subjects; but the commission has very wide powers for varying them according to the future occupation of the candidate. Thus those who declare themselves designed ulti-

mately for mercantile life escape the Latin; and the country squire's sporting son has his opening in a proviso which declares that 'youths who show special aptitude for riding and elect to serve their year with the cavalry, are to be very lightly pressed in the scientific examination.' On the whole it may be assumed that the candidate, wherever trained, however taught, will in general find no practical difficulty in obtaining the desired permission to serve the State at his own cost for a year.

If not intended for the medical or veterinary professions, the candidate who has proceeded thus far is now considered as a combatant soldier yet untrained, and must apply for leave to defer his year of service, if not prepared to enter on it in the following autumn. In time of peace such leave is readily granted, and renewed until the twenty-third year is reached; but in most cases the service will naturally follow the procuring the necessary certificates. Quitting for a time his counting-house or other place of employment, the young volunteer prepares to join the regiment he has selected. If in the line, he may do this in the spring; but for the cavalry, artillery, and rifles, it is necessary to join on October 1, and on that day the vast majority of the new *Einjährige* begin their twelve months of service, and report themselves to the commander of their battalion. If a citizen or university student of any garrison town, he need anticipate no rejection, provided the regimental surgeon be satisfied as to his bodily fitness for the arm he has selected, for colonels are authorised to receive any number of applicants who have this sort of local claim. Where none such exists the

candidate has previously to ascertain that the battalion he would choose is not already provided with the full allowance of four volunteers per company which the regulations direct to be admitted by all commanders. This being seen to beforehand, and the candidate passed by the doctor, he becomes forthwith a member of the corps after the due verification of his papers. The fact of his enrolment as an *Einjähriger* is reported to the local authorities of his district; the articles of war are read to him; and as soon as he can appear before his commanding officer in the proper uniform (prepared usually before the day of his admission to the service) he takes the oath of personal fidelity to the King, to which the reigning family of Prussia attach in these days a special importance.

Should the young cadet (for that is his real position) come from a rural district where the ways of the service are little known, and bring with him some lingering notion of hardships to be endured in his career, it will speedily disperse before the realities. From the time of his taking the oath and being posted to a company his attendance is strictly exacted at drills and parades; but in all else his life is made pleasant enough. A neat but plain mark upon the shoulder distinguishes him from the genuine recruits whose rough clothes the tailor, military or civil, may in his case replace by better material at the cost of his friends. If belonging to the mounted service he may bring his own charger, or purchase one from the Government supplies at a nominal rate. Instead of sharing the coarse fare of the privates, he lives, according to his family circumstances, with his own

friends, or in quiet lodgings, or perhaps in some grand hotel.[1] Although nominally subject to the garrison discipline as a soldier, (as in the matter of returning to his quarters at evening tattoo,) he may, with his commanding officer's sanction, replace his uniform by plain clothes when off duty, and for the hour lay the military life aside with its tokens. So far from being occupied for hours, like other recruits, with the care of his accoutrements, he is not merely allowed but recommended to employ a soldier servant to save him such menial labour, and leave his time to be turned to better uses. His parades are usually entirely in the first half of the day, so that he has the afternoon for his other employments. If studious, he continues his education. If still at the university, he attends such lectures as his attendance at drill allows, and counts the year as part of the triennial course which he must complete before taking his degree. If a young man of birth and fashion, he finds admission to all the gaieties of the place as readily as any officer or civilian of his own class. On the whole the twelve months will pass easily enough without other burden being felt than the expense which his friends incur by this addition to his civil education; and many of those who begin with some passion for soldiering let it cool in the stress of other occupations or amusements, and allow the time to slip away without making an effort to raise their knowledge of the

[1] The delusion of English travellers as to the mixing of privates and officers in the Prussian service arises commonly from ignorance of the real condition, civil and military, of the cadets whom they meet at their table d'hôte. Familiarity with the soldier is forbidden the officer alike by custom and military regulation, as well as by the difference of birth, which in no country draws a stricter line of demarcation than in Prussia.

selected branch above the level expected in the average cadet. In such case they take their places in the ranks, when positively called out for training in future years; prepared, when the usual service is performed, to lay aside the musket for ever.

Some there are every year, on the contrary, who desire to know more of the profession of arms; and to these every encouragement is given for forming themselves into the future officers of an efficient reserve. To do this is indeed, in government phrase, the chief object of this volunteer service, grateful as its economy is no doubt to the ruler, and its ease to the well-born subject. For this end an officer is told off to every twenty cadets for the special purpose of superintending their military course, which for the first six months is confined chiefly to that prescribed for the recruit. At the end of this time the volunteer, if he is found perfect in the various drills, has performed the prescribed number of guards as sentry,[1] and passed a practical examination in swimming and gymnastics, will receive his grade of acting corporal, and thenceforward may direct his mind, if he so pleases, to the duties of an officer, and prepare for the required test. Three weeks before the end of the twelve months' service, a regimental board of examination sits, composed of a captain and two subalterns, who hold an examination of such cadets as, having already the rank of corporal, wish to proceed to proof of higher qualification. They are tested, first orally indoors; then upon the ground;

[1] In the Guards the cadet is allowed, after his first three personal attendances, to pay a private for taking the sentry duties which fall to his turn.

and finally, by written papers, in all the ordinary duties of a subaltern in field and garrison: and the result, with the report of the board, is laid before the assembled officers of the corps, whose verdict on the examination, with their general opinion as to the personal qualifications of the cadet, determines the issue or withholding of the necessary certificate. This obtained, the applicant is entitled to the first vacancy as sergeant in the landwehr battalion of his own district, and in due course to a commission in that regiment; to which he continues attached until the period of his military service expires.

Many of the young nobility, who want either the interest or the inclination to devote their whole lives to the army, are among those who thus qualify as officers of a trained militia, superior in its composition to that of any other country. The majority of the landwehr commissions, however, fall to the sons of merchants, manufacturers, and proprietors; men of means and local influence, but outside the charmed pale of the 'Junker' class, which officers the standing army. It has followed as a matter of course, that the growth of the mercantile order, and its increased influence in the state, have given a political character to the former force which very completely divides it in sympathy from the regular service, and is at times distasteful to the Crown. This militia, officered by men of more substance than the standing army, and with its ranks filled with old soldiers from the latter, became naturally the more popular of the two, and threatened at some future day to form a power within the state. A jealousy sprang up on either side, which mattered little whilst the landwehr

assembled separately for their peace training, but seemed likely to paralyse the military machine devised in 1814, whenever called on for active service.

The tactical system bequeathed by that year was, in case of threatened war, to form the First Call of the landwehr (which numbered 116 battalions) into brigades; and to join to a brigade of the line a brigade of militia, to form each division of the army in the field. The reserve men of the standing army being at the same time summoned to fill up the numbers of the battalions and squadrons to which they belonged, the whole active force thus created would number 300,000 combatants. The ardent spirit of patriotism created by French occupation had, at the era of Leipsic, wiped away all class distinctions, and rendered this system fully practicable. Its retention long gave the landwehr regiments an importance justified by their gallantry in the War of Independence, and made their commissions worthy objects of ambition among the large class to which the *Einjährige* belonged; but the growing political differences between this and the King caused a distrust of the force on the part of royalty which ended in its being thrust out of its former position, and made totally secondary to and separate from the standing army.

This great change, which, in place of a popular system of training based on the spirit of 1814, has given Prussia once more a vast military machine such as Frederic and Frederic's father loved to rear, was not brought about in a day. Three times the Government called out the field army before the

decisive hour arrived: in 1850, when his dynastic traditions caused the late king to make the breach between the Elector of Hesse Cassel and his subjects a means of extending the popularity of Prussia among the people of the minor States, as Austria sought for the favour of the princes: in 1854, when pressed by the Western Powers to take part in the war against Russia, he armed to preserve his own neutrality: in 1859, when the indignation of all Middle Germany at the progress of French arms in Italy extended northward and moved King William (then Regent) to place his contingent on the Rhine as a threat to Napoleon III. Though no hostilities followed to test the system by the stern proofs of war, the Government found it unready for action, and ill-suited to the needs of a bold policy. On each occasion it was observed that the tactical combination of elements so differently constituted worked badly in practice. The landwehr officers showed jealousy both of the assumed superiority of their comrades of the line and of the staff who controlled the whole. Educated in a thorough military course; possessed generally of more means than the regulars; and commanding soldiers as good at the least as the recruits under the latter; endowed moreover, constitutionally, with a sort of military equality; they gave plain signs of impatience under the actual demands of their call to field for the support of a policy which, in two of these instances, was not heartily favoured by the sympathies of the nation.

The royal government saw clearly enough that an army thus composed could not be relied on for accomplishing the scheme of German dominion be-

queathed by the Great Elector and his successors as the hereditary legacy of the Hohenzollerns. To advance beyond the dual system established by Frederic —to deprive Austria of the rights formally ceded to her on the erection of the Bund—to thrust out from the Confederation that ancient rival, and leave Prussia free to draw to herself its weaker elements by the gravitating force of nationality—these projects, long mooted in Berlin councils, required not merely bold statesmanship to devise but a strong and ready force to execute the plan. The landwehr must be replaced in the field army, before the Cabinet could take the bold aggressive, for which the humbling of Austria in the campaign of Solferino paved the way; and the alarming growth of French power, with the actual difficulties which arose from the old organisation when Prussia, in that anxious summer, mobilised her corps on the Rhenish frontier, formed opportune military reasons for the reform which had long been contemplated. That this reform was distasteful to the representatives of the people was the natural consequence of its execution in open disregard of their right of granting supplies, and of their avowed leaning to the landwehr. It is hardly less clear that it was thoroughly in unison with the wishes of the noblesse; for their particular interests were involved in the coming enlargement of the regular army, whilst their natural sympathies were with the royalty that supported, rather than the middle class which threatened, the privileges of their order. From the first, therefore, King William was sure of the support of his Upper House, as of opposition from the Chamber of Deputies, through the long

parliamentary conflict which it needed victory in the field to close.

With this encouragement for reform, the impression produced by the palpable failure of the Prussian organisation in 1859, and its inferiority to that of France, was not suffered to grow cold. The following year saw the national force receive, by the mere will of the executive, a change as complete as any ever wrought by republican vote or imperial decree; and notwithstanding six years of firm remonstrance on the part of the House of Deputies, the new system was maintained in every detail until the long-prepared-for war came to justify its authors in the eyes of the nation. The yearly supply of recruits actually drafted into the line was raised from 40,000 to 63,000—a difference which the increase of population since 1814 prevented being specially burdensome. The standing army was augmented by 117 infantry battalions, 72 squadrons of cavalry, 31 companies of artillery, 18 of engineers, and 9 battalions of train for the hitherto insufficient transport departments. A far more serious innovation was the prolonging the two years of 'reserved' service of the discharged recruits by two more. This class of men are so liable to sudden call, and so subject to government inspection, as to be (excepting such as have qualified as landwehr officers) but one degree more free than if still in the ranks. The unpopularity of the measure was complete when it appeared that the special use of this doubling of the line reserve was to exclude the landwehr from their former position as part of the field forces, and reduce their service to one of home garrison or

similar duty. In peace the standing army to be maintained was now as large as before it would have been with the addition of the whole First Call. In war, when the reserved men are all called into the ranks, it numbered 300,000; or, including depôts and garrison artillery, 380,000; to which the First Call was to give[1] a second line of defence 100,000 strong. The men of the Second Call were promised exemption from duty except in the emergency of invasion, or of deficiencies in the other lists, a concession not ungrateful to citizens past their thirtieth year, and of whom five-sixths are computed to be married; and the service in it was shortened two years, in the First Call three, as some compensation for the additional time of attachment to the line reserves.

Into the history of the constitutional struggle which followed the promulgation of these ordinances it is not needful here to enter. The popular party failed to shake the position which had been taken up by the cabinet; and their efforts had little other effect than to hurry on the foreign policy of the government to that open rupture with Austria for which the change was expressly made. The Kaiser's vain attempt in 1863 to create a German parliament, prince-governed, and ready to prolong his presidency, furnished doubtless one strong motive to determine Bismarck (whose bold and successful conduct in the crisis made him thenceforward ruler in Prussian

[1] This proved in the War of 1866 to be but a paper estimate; for, on the mobilisation of the forces in the spring, the numbers were found incomplete in both army and First Call, and portions of the Second Call were very early drafted to take their places.

councils) to seize the first opportunity of testing the strength of the machine which existed only in open violation of the constitution. The Schleswig-Holstein question then arose; and Prussia was enabled, by the bold spring she took to the leadership in action against Denmark, to place Austria in the secondary position of a half-willing ally, and to show to the world the impotence of the Bund, apart from the Berlin cabinet, for action in Germany. Denmark once beaten into submission, it remained only to so carry on the system of joint occupation of the Duchies as to force Austria from one concession to another into hostility; and while degrading her first by policy, to feign just so much unwillingness to quarrel as might avoid giving pretext for foreign interference, or for the Kaiser to arm for war.

The eventful year 1866 found the military system of 1859 fairly complete in all its parts. The additions to the cavalry were not indeed wholly made; but in all other respects the active forces were complete in their cadres; the reserve lists full of trained men; and the whole could be made ready for the field at less than a month's notice. Provided thus with an army whose officers were utterly devoted to the Crown, the power of discipline was relied on for carrying its mass as boldly forward in the coming campaign as though the whole nation had urged the war. The landwehr in their second line could do but little by tacit disapproval; and in case of the field army's success, their military instincts would lead them to support their victorious brethren. The successful intrigue with Italy promised to reduce the Austrians to a numerical inferiority on the northern

border. Their infantry, if better trained, was inferior in both composition and arms. One single disadvantage remained in a military view in the supposed inferiority of the Prussian officers, those of higher rank especially. Dependent as these are on a tedious and depressing system of seniority, the long peace had thrown commands into the hands of men respected for their connexion with the struggle against Napoleon, but past[1] the usual age at which a general leads his troops with vigour. On the other hand, the recent wars of Austria in Italy and Hungary had given her staff experience, and raised up among them officers who had the promise of fame in the prime of life. One of these especially had acquired a name beyond that of any other soldier in Europe, and with it the entire confidence of the military whom it would fall to his lot to command.

Here, however, came to the support of Prussia the instinct which had for generations led her princes to give to that profession of arms by which their house had risen, the chief place in their studies. The King himself had served successfully as a commander in the short campaign of Baden. His son and heir had been carefully educated in all the details of military knowledge. His nephew, Prince Frederic Charles, had become known beyond the limits of Prussia as an earnest devotee of the science in which his ancestor had instructed all Europe. He had been ardent in the improvement of Prussian tactics ever since the year of Solferino brought their deficiencies to light;

[1] Of such are Herwarth, Steinmetz, and Vogel. The former, with his younger brothers, left their school in 1813—the eldest being then bu sixteen years old—to serve in the War of Independence.

and in his celebrated pamphlet, the Military Memorial, published in 1860, had appealed to the martial spirit of the kingdom by showing how the ancient superiority of its army over that of France might be restored. The events of the Schleswig campaign (in the latter part of which he commanded the Prussian contingent) made him known as a good practical officer, who had been hitherto regarded as a theorist, and gave him a foremost place in the military councils of Berlin. To him the army naturally looked as their leader when the shock with Austria became inevitable; but the claims of the Crown Prince, no less than the vast extent of frontiers to be lined, caused the division of the forces directly opposed to the Austrians into the two great wings in which they afterwards acted; a third body being judged necessary for the seizure of Saxony from King John's contingent, so as to conduct this operation without uncovering the line of defence which guarded Berlin from the Elbe to the Oder. This service was entrusted to General Herwarth, whose vigorous performance of it, coupled with the reputation already won by his passage of the Alsen Sound in 1864, fully justified his retention in a separate command to the end of the war.

This triple division of the force directed against Benedek would, according to former theory, have borne within it the elements of failure. The traditions of warfare are nowhere more modified, however, than in this matter. The Prussian staff had diligently studied the lessons given by the American War in combining field operations, however distant, by means of the electric telegraph. To this newly developed

power, in the hands of a specially organised staff, the King trusted for the general direction of the whole scheme of the campaign, and secured the necessary singleness of will by entrusting the sole charge of its strategical execution to his valued adviser, Von Moltke. This general, early noted for the military ability which gave him the peculiar confidence of the Berlin Court[1] forty years since, was yet little known before the war beyond the royal circle and the office in which his whole life has been spent; and his success has singularly illustrated the truth that the larger operations of strategy may be—where sufficient talent and professional knowledge exist—in great part prepared in the closet, in these days of rapid communication. To the pen of Prince Frederic rather than to his, are generally understood to be due the 'Royal Ordinances for Exercises of Troops on a large Scale,' which were issued to the Prussian army shortly before the Danish War, and combine the results of close study of the theory of tactics with those derived from practical observation.

In this work, rather than in the private 'Instructions for Needle-musket Drill,'[2] we may expect to discern the value placed upon the new arm by the highest military minds in Prussia before the campaigns of 1864 and 1866 had tested it in practice.

[1] General Von Moltke was intrusted (being then a Major) with the Prussian interests in Turkey after the remarkable campaign of 1828–9, of which he has written a thoughtful and scientific history.

[2] The drill-book for the Prussian breech-loader, though nominally secret, has been read all over Germany for many years past. It is commonplace enough, and gives no clue to the field value of the weapon. The only real secresy observed has been as to the nature of the fulminating composition used in the cartridge.

The first employment of the breech-loader against the Baden insurgents impressed unfavourably the officers of the troops engaged, and left a vague belief in the army (a belief which acted powerfully on those of other nations) that its wastefulness of ammunition would render it unfit for the uses of a hard-fought campaign. There were men above these, however, more clear-sighted, as well as of more influence with the court. They were able to distinguish between the misuse of the new ally by the raw half-trained recruits which followed the standards in the brief struggle of 1849, and its power when skilfully handled; and had discernment enough to lay, during the twelve years of peace that succeeded, the foundation of the successes of Nachod and Skalitz. The Ordinances of 1861 may be held to sum up the results of their study; and as far as our present knowledge of the late war extends, there is no reason to believe that these results will be much improved on by the experience of the Bohemian War.

Taking for granted the probability of meeting an enemy armed solely with the minié in some of its varied forms, officers are reminded that the superiority of the fire of the breech-loader can only be shown on an exposed enemy, within moderate distance (shown by experiments to be not more than 500 paces), and by giving time for the rapidity of the fire to tell; and that under these conditions its effect will be threefold as severe as that of the muzzle-loader. They are therefore taught that in all contests of infantry they must keep three objects in view; (1) to receive or approach the adversary on as open ground as may be; (2) to endeavour to keep him as long as possible

engaged in a musketry contest[1] and (3) *to handle their own troops in deep formation.* The value of this last recommendation is explained by the statement, that a line of 300 men firing in front will be equal at least to 900 of the enemy; and that, when once he is disordered, the rear parts of the column, with their fresh men and full pouches, can be thrown out upon the flanks to drive in and turn those of the mass opposed to them. This practice, no doubt, was the secret of those sudden flank attacks which surprised the Austrian officers, and caused them such severe losses in prisoners.

Had the Prussian staff, it will be asked, no reliance on the weapon for skirmishing, or driving the enemy from cover? Not much, it would appear, from the theoretical views in this work: and the lesson which should have been taught the troops opposed is no less clear from this, than from the actual fact of the complete failure of Prince Frederic's attack at Sadowa on the very poorly intrenched position of the Austrians. For the defence of posts, on the contrary, it is specially noted in the 'Instructions' that the needle-gun will prove of much value—'provided,' adds the unknown author, with a touch of hesitation, 'that there be cartridges enough.' In this part only is to be traced some lingering doubt as to the wisdom of putting in the hands of the soldier

[1] It is here that the chief difference is to be found between these instructions and the principles laid down in the Military Memorial. The latter strongly insists on the necessity of constantly taking the offensive in order to raise the moral power of the army. It is evident that the royal writer, at that time at least, did not comprehend the enormous advantage which the breech-loader gives for the defensive against the advance of an assaulting column attempting to close.

the means of so quickly getting rid of the contents of his pouch. This, doubtless, it was that prompted the Prussian staff to look, before war came, for the proper remedy to this one weak point of their system, by increasing and distributing the small-arm reserves of ammunition in the manner Captain Hozier described. The ascertained fact that a certain fraction of the privates engaged at Koniggratz actually got rid of ninety rounds, is proof sufficient that these precautions were not misplaced. It affords also some justification for the doubts which were everywhere expressed among military men, as to the difficulty of using so quick-shooting an arm with advantage, in the excitement of a prolonged action.

Much has been said of the superior intelligence of the Prussian soldiery, as bearing on the question of the new arm; and it is quite true that, in the late campaign, the armies that invaded Bohemia brought with them a large leaven of the educated classes from their reserved lists—*einjährige* who had not passed as officers—equal in all social respects to those volunteers of whom our own nation is so justly proud. This peculiar condition once known, its advantages have been sung to the full by the mass of hasty writers who worship success in Bismarck's person, and gaze only on the bright side of the Prussian shield. History, however, should have clearer eyes in so grave a matter; and the truth, when fully apparent, if not quite new to certain of these ready penmen, will astonish those who have been guided by their teaching. It is natural, no doubt, that correspondents trusted, fêted, smiled on by the staff of any army, should adopt the views

current at head-quarters, and give little heed to the gossip of the private's mess. Yet it is hardly credible that anyone of observation should have watched the armies prepared for the forward rush which was to end in so great a triumph, and have been ignorant of the deep-seated disaffection which, up to the hour of the first victory, threatened to baffle the strategy of Moltke and the policy of Bismarck. We speak not here on the authority of single Prussians removed from the war, nor that of the unanimous assertion of the liberals in the Minor States; but from the testimony of careful witnesses. Murmurs and threats against the then unpopular minister were no less plainly heard in the camps around Glatz and Görlitz, than in the democratic circles of Frankfurt or the courts of Austria's allies. Curses on the author of the 'One Man's War' were as plentiful in Herwarth's corps, even after the successful overrunning of Saxony, as when the order came which dragged the *Reservisten* unwillingly from their homes at the call of their ambitious rulers. Though 'thinking'—according to a remarkable expression in the preface of the original Frankfurt edition of the Military Memorial—'is forbidden to the soldiers of Prussia;' though 'there be,' according to the same authority, 'an impassable gulf between the noble officer and the private;' the admixture of intelligence introduced by the volunteer element, acting on the increased education of the mass of the soldiery, gave promise of fearful danger to the government which had provoked the war, had anything short of success, both speedy and great, been its result.

On such success Bismarck staked and threw.

Much of the disaffection sure to be produced by the mobilising of the army in its new form he was prepared for; but with this danger the measure brought in his eyes the remedy. Austria, though successful in deceiving her own wellwishers as to the extent of her resources in Bohemia, had not blinded his keener observation. Barely 220,000 men, and those with an incomplete commissariat, were all that her favoured general could command to the north of Vienna; so sorely were her resources taxed by the attempt to maintain the hold on Italy which has cost the Hapsburgs so dear. It is true that from the lesser States a diversion was hoped for against Prussia, which would give time for the slower power to assemble reserves existing as yet only on paper; and enable her, as in 1813, to issue forth with advantage from the great angle of Bohemia when preconcerted delay had done its work. Bismarck, however, was here more wise than Napoleon. Delay there was none on his side, save just what was needed for bringing out the new Field Army in its full strength; and in view of the doubtful spirit existing in its lower ranks, the magnitude of the stake which was to be won by striking home against Benedek, and the danger of relying for the main shock on any part of the landwehr, the bold resolve was arrived at which gave Moltke the means of success, by placing on a single frontier almost the whole of the regular forces. Almost the whole; because thus only could easy and complete success against Benedek be obtained; and yet not quite all; because the local circumstances of Western Prussia rendered it impossible to strip that district entirely of regular troops.

It must be remembered that the Westphalian and Rhenish provinces were divided from the rest of the kingdom by the interlying territories (now annexed) of Hanover, Hesse Cassel, and Nassau. Of these Powers, all favouring Austria, the first possessed an army of 20,000 men; formidable by its training, its traditions, and even its weapons, which were Prussian. If opposed by no troops but landwehr, it seemed probable that this force might maintain itself against their attacks; might even cut off all communication between the Lower Rhine and Berlin; and form a powerful advanced guard to the levies to be raised by Bavaria and her allies upon the Main; so that the latter might be enabled by a very slight advance to unite with the Hanoverians, and threaten that capital. To avoid this special danger, a full division, forming one-half of the 7th (Vogel's) corps, was collected under General Goeben at Minden. Vogel himself, a fierce old soldier of the Blucher school, was to command; and to aid him in the occupation of Hanover, the troops under Manteuffel (which had just driven the Austrians out of Holstein) were to move southward to his support; and the reserves of the adjacent garrisons (most of them assembling at Wetzlar under General Beyer) were added to his command. Of the successes he obtained—extraordinary in their way, but derived chiefly from the divisions of his opponents and the moral support of the Bohemian victories—we have no space to speak. It is of more importance to observe that he was left to operate partly with the distrusted landwehr (whose recent mutiny at Frankfurt, in the hour of Prussia's rejoicing proves their sentiments far other

than those of unreasoning loyalty); in order that the superiority of Moltke might be assured on the Bohemian frontier. Here the other half of Vogel's corps, added to Herwarth's, formed the third or Elbe army, which after occupying Saxony became part of the general force destined for the invasion. Deducting Goeben's division, and excluding also the garrison artillery, depôts, Holstein troops, and the necessary detachments, there were assembled, under the three commanders, eight and a half of the nine mobilised corps of the regular army, numbering, according to the lowest Prussian estimate, 260,000 fighting men.

To bring this great army over the mountains, and unite it before the enemy, was the problem to be solved. This once accomplished, the superiority of numbers, weapons, and physical condition would lie on the side of the Prussians; and the Austrian chief could hope only by some successful defensive scheme to prevent the threatened danger. It is easy to condemn defeat and criticise misfortune; and to speak briefly, Benedek's own generalship will not bear examination in detail. From the first, however, the rapid tactics with which the Austrians had of late years manœuvred their infantry proved ineffectual (as the Prussians had plainly foreseen) in attacks made on open ground in face of the needle-gun. Nor does General Gablenz appear to have varied this for any better mode on the 27th, when he obtained his advantage over Bonin before Trautenau—the only success of his side during the campaign. Be this as it may, he was left unsupported; was turned next day by the advance of the guards through the unguarded pass of Eipel on his flank; and the progress

continued, without further check, which united the Prussians around Horwitz. Benedek was less happy here than Lacy; although had he taught his troops to follow the lesson bequeathed by the latter, and to keep to the defensive, his success might have been the same as his predecessor's. A few days' arrest of the Prussian advance would have made a strange change in the tone of that triumphant army; as even the three hours of uncertainty at Sadowa showed by its serious effect upon their staff.

Even so late as that day of Austria's ruin, had Benedek guarded his right with the same care as his centre, who can say what would have been the result? It needed a gross tactical error, unequalled even at Austerlitz, to give the Prussians the victory, which their superior combinations as to numbers, and their moral advantage from the recent successes of the needle-gun, seemed to ensure beforehand. If here we condemn Benedek for his ill-fought battle, let us not forget that Napoleon fell before the same disproportion [1] of numbers at Leipsic; and that the Austrian general at least escapes the censure which is fairly due to the French Emperor for an ill-secured retreat. That the army was brought across the Elbe the same evening, was due no less to his precautions

[1] According to the fairest estimate (that of Cathcart), the numbers engaged on the great day of Leipsic were, on the side of the allies, 230,000, of the French, 160,000. At Koniggratz, the Prussians had 250,000, the Austrians, 185,000, by the most moderate accounts. It will be observed that this exceeds in dimensions the former—previously the greatest battle, as to mere numbers, recorded in any authentic history. There is a strange tactical similarity between these two gigantic conflicts; and in each the defeat, though not (as certain partisan writers allege) due to, was enhanced by, the misbehaviour of contingents fighting against their will.

as to bridges, than to the fine conduct of the Austrian cavalry. Had Blucher's spirit been with the pursuing horse, the war should have ended on the field without further effort. The prosperous staff of the victors, and the pens they have inspired, have done but scant justice to their opponents in this matter.

If it be asked what moral should our nation draw from the history of the recent war, the reply must needs be twofold. A military writer cannot but observe that the new Prussian system is not merely firmly established in North Germany by Bismarck's success, but that it is more than likely to become, with some modifications, that of the other chief Powers of the Continent. It behoves our statesmen to look closely to that of their country, and to see whether it may not, without increase of the paid staff, be made more elastic, in case of the sudden demands which war would inevitably bring. That our infantry must be not only armed with the breech-loader, but trained especially to its use; that our light artillery must learn to put but little faith in the practical effect of fire at long ranges; that cavalry are still essential to the service of an army in the field; are obvious lessons of detail. Not less so is it one, that whatever combatant force is maintained, the complete equipment and machinery for the service of a much larger one must be prepared and kept at all times ready for immediate use.

There are deeper and graver questions to be solved than these, since Prussia's success was won. It may be that those have truth on their side who say that Bismarck is but an instrument for working out the

longed-for unity of the German race; and that his task once done, the minister, with the monarch he guides, will sink into secondary positions before the progress of constitutional government. We confess that we are not so sanguine. It is too early by far to attempt to foretell the end of this mighty drama: but there have been signs, in threats directed at Holland, Denmark, and even Belgium; in dark allusions to the opening Eastern question; in the demand for funds in hand against new wars foreseen yet not plainly spoken of, which may well make the greatest lover of the doctrine of nationalities doubt whether the new empire—founded as it was, and built up on Sclavonic spoils—will of necessity stay its bounds where the German tongue ceases to be spoken.

We have endeavoured in the preceding pages to trace the historical growth of the military power of Prussia, and to describe the present condition of the military institutions which have suddenly conferred upon her an indisputable supremacy in Germany, and one of the foremost political positions in Europe; and we have done no injustice to the patriotism of her princes, the dexterity of her statesmen, and the valour of her armies. But the triumphant success of what may be termed a great military conspiracy against the existence of her own confederates, who were ill-prepared for so fierce a contest, and the political results to Northern Germany, although in themselves advantageous, cannot efface the recollection of the overbearing and illiberal policy on the part of the Prussian Court, which marked every stage of the late transactions, or of the mysterious and clandestine understanding which procured for the time

the neutrality of France. The unchecked success of Prussia in her enterprise gave, as we believe, a deep blow to political morality; it has shaken all trust in those public engagements on which the peace of the world depends; it has taught mankind once more the hard lesson that strength alone, and not law, can give them security; it has placed all the smaller States of continental Europe at the mercy of three or four colossal empires; and it has compelled even these empires to augment their immense military establishments, and to press their whole adult male population into the ranks of their armies. Great indeed must be the advantages and political results of the new system to be established by the Prussian arms, which can compensate mankind for these positive evils. But what are these results? Let us try them by a single test.

Hostilities commenced in the Elbe Duchies because it was not to be endured by the German nation that two small provinces, in which the German race preponderated, should be cut off from the German Fatherland, and governed by a foreign sovereign. To win these Duchies back to Germany, the Danish Monarchy was dismembered, a solemn treaty was broken, and Prussia has now settled the question by annexing them to her own dominions. But the very same operations which accomplished this object, have produced contrary results at the opposite extremity of Germany. There, too, are German Duchies and German provinces, inhabited by eight millions of Germans, including the first of German capitals, and identified with the whole current of German history. Is it credible that the Duchies of Austria, Styria, and

Carinthia, with the Tyrol have been ejected from the German State, by the very same policy used to bring the Duchies of Holstein and Schleswig into it? The Treaty of Nikolsburg has in fact dismembered Germany, and consigned these important German provinces to form part of a monarchy, now expressly excluded from Germany and linked to those non-German elements which numerically preponderate in the Austrian dominions. They are now, in fact, the German appendages of the kingdoms of Hungary and Bohemia. At the same time the independent States of South Germany, too large to be absorbed by Prussia, but too weak to stand alone, have been left to form a pretended confederacy without the possibility of its duration. In other words, all that could add to the paramount force of Prussia has been seized and incorporated by her; but the remainder of Germany has been deprived of its former constitution, without even the liberty to form a new combination. These considerations suffice to demonstrate that the terms of the recent treaty of peace were insincere and incomplete.

As we revise these pages Europe has armed for a new and more tremendous contest. The sword is drawn, and Parliaments are forgotten. Liberals must defer to another era their hope of constitutional government: and it becomes clear to the whole world that the success of 1866 was but a single step in the path which Prussian policy treads.

THE MILITARY INSTITUTIONS OF FRANCE.[1]

[*Reprinted from the* EDINBURGH REVIEW, *July* 1867.]

IF the Constable's sword and the Marshal's staff of modern France were in the hands best able to wield those symbols of military authority, the three distinguished officers, whose publications stand at the foot of this page would probably not have employed the pen to place their experience and judgment at the service of their country. But as matters stand, France is indebted to them for a most animated sketch of her military institutions, and all Europe may profit by the wise and enlightened principles of military organisation which they have expressed in these pages.

The cause which has opened this momentous discussion is not far to seek. The astonishing results of the campaign of Prussia against Austria and the Minor German States in 1866, awakened doubts where no doubts existed before, as to the relative strength of the great continental armies. The Prussian system, which was officially regarded and

[1] 1. *Les Institutions militaires de la France*, par M. le duc d'Aumale: Bruxelles, 1867. 2. *Un Mot sur le Projet de la Réorganisation militaire*, par le général Changarnier. 3. *L'Armée française en* 1867, [par le général Trochu,] seizième édition: Paris, 1867.

described in France, but a short time ago, as 'a school of militia, of doubtful value for defensive warfare, and extremely imperfect in the first period of offensive operations,' has suddenly shown itself to be the mistress of Germany, and has become an object of interest and emulation to the rest of Europe. The French Government instantly, and perhaps hastily, avowed that it could no longer regard the existing armies of the Empire as of sufficient strength to uphold the military renown of France against so formidable an antagonist. A Bill was immediately prepared to enable the Government to raise the forces of France to no less than 800,000 men; and although this measure has not been received with favour by the population, by the legislature, and even by the military authorities, it is not denied that a large augmentation of the reserves of the French army is indispensably necessary, and that the burdens of military service and military establishments are likely to be increased there, as in every other part of the Continent.

This is, it must be confessed, a deplorable result of the political changes which have been effected by the ambition of Prussia and by the policy of Count Bismarck. Already, before the late war, the enormous amount of the forces levied by conscription and maintained at a prodigious cost, were the standing reproach to our age, and a standing menace to that peace which is cordially desired by all nations. We had ventured to entertain hopes that sooner or later a general disarmament might be effected; and that France, which was so long regarded as the only Power capable of threatening the tranquillity and

independence of other nations, would some day set the example of a more pacific course of action. But whatever may be thought of the political institutions of the French Empire, justice and truth require us to acknowledge that up to this time it is not by Napoleon III. that the great treaties, on which the law of nations and the peace of Europe rested, have been set at nought, and that it is not France which has snatched an immense political aggrandisement from a military triumph. On the contrary, the consolidation and increase of the vast military powers of Germany under a single sceptre were more unwelcome and dangerous to France than to any other Power; and these events forced her to enter upon an inquiry into her own resources, which she would willingly have avoided. The effect of the comparison which has thus been instituted between the work which the Prussian armies have lately performed and the work of which the French armies are capable, has disturbed the complacency of the French; it has awakened a suspicion that they may be behindhand in the great evolution of military power in which their neighbours and rivals have made so much progress; and it has satisfied reflecting men that no absolute reliance can be placed on the splendid achievements of the past, or on resources which seemed but yesterday to be invincible, to maintain the honour of the French arms and to ensure the safety of the country. A more thorough organisation, a more comprehensive system of enlistment and of reserves, a more effective armament, and perhaps a new system of drill and tactics, are required to encounter with success an antagonist by

whom all these improvements have been already carefully studied and zealously prosecuted.[1] These truths are now commonly admitted in France, not without some sacrifice of national pride, though with no misgiving as to the ultimate result. They are truths equally important to ourselves and to every other State. It is undeniable that immense changes are occurring, and have occurred, in all that relates to the formation, instruction, and command of armies. The circumstances under which war will hereafter be carried on are more sensibly altered than they have been at any time since the invention of gunpowder; and the Power which is first able to turn these altered circumstances to its own advantage will have at the outset a superiority which may, as at Sadowa, decide in a few hours the fate of a campaign.

Nevertheless, the art of war, like all the sciences which are the result of combination, is reducible to certain fixed principles equally applicable in all ages; and whilst all the accidents of warfare are being transformed around us, it is more than ever important to adhere to those elementary truths which are common to every army and to every age. These will form the subject of the present Essay. The details of the organisation of the French army are not of a nature to interest and instruct the general reader; they must be reserved for more technical investigation. But the merit of the eloquent and

[1] The well-known anonymous pamphlet which appeared in Germany three or four years ago under the significant title 'How to make war on the French,' is now acknowledged to be the composition of Prince Frederic Charles of Prussia, one of the victorious generals who commanded at Sadowa.

patriotic writings to which we propose to refer consists in the application of broad and constant principles to an altered state of affairs; and the Essays of the Duc d'Aumale and General Trochu contain so much wisdom and thought that they cannot be read without advantage in any part of the world.

The history of the organisation of the regular army dates in France, as well as in this and other countries, from about two centuries ago. Prior to the reign of Louis XIV. and the later years of the English Commonwealth, war was carried on by men-at-arms, troops of horse, and bodies of troops who bore the same relation to a modern army that a picture by Wouvermans bears to the armies of Solferino and Sadowa. The soldier was equally brave and more independent; but the art of acting in great masses, and the discipline by which the individual is entirely merged in the corps to which he belongs, is of comparatively recent date. The formation of regular armies required systematic organisation—uniformity of arms and dress, regularity of advancement, stricter conditions of service, graduated pay, and more certain methods of ensuring the sustenance of troops.

These are the elements of which Louvois was the first great master, and by his careful application of them he contributed more to the success of the arms of Louis XIV. than Turenne and Luxemburg, who led the French forces to victory in the field. The whole administrative correspondence of Louvois still exists in the 'Archives de la Guerre' at Paris; it has recently been carefully examined by M. Rousset, and the result is a biography of that great minister,

which is one of the most interesting and instructive books of the present day.[1] The organisation of the French army by Louvois lasted, with no material changes, until 1793; it perished in that great convulsion which overthrew the privileged classes, who played so great a part in it, and the monarchy. In the French army thus constituted during the eighteenth century most of the peculiarities prevailed, which have now disappeared from every European army but our own, and are now fiercely assailed in this country. The men were raised by voluntary enlistment. The regiments retained a local name and character from the districts to which they belonged —the brigades of Picardy, Normandy, Champagne, and Auvergne corresponded to our Coldstream Guards, Sutherland or Gordon Highlanders, Connaught Rangers, or Welsh Fusileers. The King's Household troops were a privileged corps, with this distinction, however, that in the Royal Guards and Musketeers the purchase system never obtained, and that they were open to all ranks of society. In the rest of the army, regiments and companies having been originally raised by private persons for the service of the Crown, had become a species of property, like the commissions in our own army. The old French army was a highly aristocratic institution; for although the purchase of commissions was tolerated, Louvois had contrived to make the military service rather onerous than profitable, and the consequence was that the rich and the noble could alone

[1] *Histoire de Louvois et de son Administration politique et militaire jusqu'à la paix de Nimègue.* 4 vols. Paris: 1862.

hold them. The French nobility served with unflinching courage and enthusiasm; they were as ready to spend their fortunes in the purchase of a step, as to spend their blood on the field of battle. And although the *roture* were not absolutely excluded from the rank of officers, and commissions were sometimes vouchsafed by the King even to private soldiers of signal valour and merit, the *noblesse d'épée* may be said to have officered the army. Even the ferocious energy of Louvois, backed by the vigour of his great infantry inspector, Colonel Martinet (whose name has survived for a couple of centuries to designate a military precisian), failed to correct these abuses, which were rooted in the social system of the age and country. The army was essentially royal and aristocratic when the storm of 1789 burst on France. The unwise expatriation of the nobility and the fall of the throne destroyed it, and in fact Louis XVI. did not at any period of the revolution derive any strength or support whatever from the troops who wore his badge, and would at first have been ready to die in his service.

These considerations are grave and instructive. They show that an army of an exclusive character, based mainly on the old principle of personal loyalty to the Sovereign, may become a snare and a delusion. Modern armies are paralysed unless they have the strength of a nation behind them. They are now become so completely the avowed instruments of public opinion, that against public opinion it would be impossible for them to act. There is now no country in Europe, except Spain, in which the Government can be said to rely on its military power

for existence; and a government in that condition will probably not rely on it long.[1]

In 1791 the French army consisted of 166 regiments of foot and horse. The regulations promulgated at that time at the Camp of St. Omer still form the basis of the drill and manœuvres of the troops—though, as we shall presently see, they have been overlaid with an enormous mass of subsequent matter. These troops were well-trained, but the corps were numerically weak; and the political agitation of the time had shaken the unity and self-reliance of the army. The consequence was that the outset of the war was disastrous; and the prodigious enthusiasm and energy of the volunteers of 1792 and 1793 alone restored victory to the standards of the Republic by defeating the Prussians at Valmy, the Austrians at Jemmapes, and planting the tricolour flag on the walls of Mayence. These events proved at once the value and the weakness of a great volunteer movement. The popular movement of 1792 saved France; but in the following year, when it was opposed to the renewed operations of regular troops, the spell was broken, the charm was over. The army of the Rhine was thrown across the Lauter; the army of the North was driven out of Belgium; and it became more than ever difficult to raise men for the necessary service of the country. On the 1st January, 1793, the eight armies of the French Republic had not more than 150,000 men in their ranks. For, as the Duc d'Aumale observes with great truth, '*it is of the essence of special volunteer*

[1] This prediction was shortly afterwards fulfilled by the defection of the Spanish army and the expulsion of Queen Isabella.—H. R. 1870.

corps not to renew their strength, although the mere existence of these corps seriously interferes with, and may arrest, enlistment for the line.' This remark well deserves to be remembered, especially in a country where a great volunteer movement has recently added considerably to the national forces. The French patriots of 1791 having enlisted for one year, took their discharge when that time had elapsed; 60,000 of them returned home. The Convention called out 300,000 National Guards, but the measure failed for want of authority to raise them. St. Just had in his pocket a statement showing that the army consisted on the 15th July, 1793, of 479,000 men; but it is doubtful whether it really amounted to one-third of that number. Toulon was taken by the English, Lyons was in insurrection, the eastern departments were invaded, the country was in a supreme hour of danger, when Carnot joined the Committee of Public Safety, and six days afterwards the 'levée en masse' of the nation was decreed by the Convention. At that moment sprang to life the National Army of France.

'This measure differed essentially from the requisition which had preceded it. More harsh in appearance, it was less vexatious and oppressive in reality. The law of the 20th of February placed all citizens from the age of 18 to 40 (at one moment even from 16 to 45) under the grasp of an arbitrary rule and subjected them to the caprice of a local authority; that of the 20th of August abolished this discretionary power, confined itself to men from 18 to 25, but within those limits *took them all.* In six months all the pressure of the Reign of Terror had failed to raise 300,000 men under the former law. In three months the general levy was effected, without serious opposition, under the latter law.

Let it not be said that it was the guillotine which saved France! On the 1st of January, 1794, the strength of the army had risen to 770,932. Deducting the armies of the West, of the coasts, of the interior, of the depôts and the non-combatants, it may be reckoned in round numbers that France, being assailed by 400,000 troops of the Coalition, opposed to them 500,000 fighting men *in line*, an imposing number which we believe to be accurate, though it is less than the evaluation of Cambon, and which has never to this day been exceeded in any army composed exclusively of national troops.' (*Duc d'Aumale*, p. 53.)

This vast army was consolidated by the genius of Carnot into one uniform mass. All distinctions of corps, and even the grades of the non-commissioned officers, were abolished. The local appellations of the regiments which had so long been the glorious war-cry of 'Navarre sans peur' and 'Auvergne sans tache,' were superseded by the numbers of the new demi-brigades. The uniform of the whole army became identical, though it was not without regret that the men exchanged the white livery of the Crown of France for the blue tunic of the Republic. The strength of the demi-brigades or regiments was fixed at three battalions or twenty-seven companies, which they still retain. Such was the constitution of the immortal armies of the 'Sambre et Meuse,' and of the 'Rhin et Moselle,' which saved France on the plains of Fleurus, won twenty-seven victories in a year, captured 3,800 guns, and dissolved the Coalition.

'But that which was beyond all praise was the noble and manly bearing of this victorious army. Carnot, by his example, and by the spirit which dictated his measures, had

infused these civic and military virtues into all its ranks. To borrow the phraseology of the time, which spoiled so many of its triumphs, but which was not always false, he had placed courage, self-sacrifice, and disinterestedness on the order of the day. . . . The discipline of the army had ceased to be vexatious and galling: but it was firm and even severe in the unfrequent cases in which repression was necessary. Even the German inhabitants of the banks of the Rhine were struck with surprise and admiration at the demeanour of these republicans. They saw these dreaded soldiers enter their towns in ragged clothes, often in wooden shoes, but with a martial air: they halted in the market-places amidst a terror-stricken population, ate their own black bread beside their piled arms, and awaited in their ranks the orders of their officers. Contributions of war were levied, but they were levied by the commissariat which followed the army, and did not share its self-denial. Sometimes the neglect of the commissariat caused the men to maraud, but not to pillage. In the sharp winter of '94–95, which the army of the Rhine passed before Mayence, the troops, reduced to the utmost necessities, stole bread, but bread alone. At the time of sowing seed, they watched the peasants by day, and at night they dug up the seed-corn from the furrows with their bayonets. It is recorded by those who were in both campaigns that the hardships endured by the troops in 1812 were not more severe. Many died of cold and hunger; but those who survived remained faithful to their colours. If they dispersed in search of victuals—and what victuals! wild fruits or poisonous bulbs—they were in the ranks again at the first cannon-shot. The officers shared the penury and the destitution of the men. All led the same frugal life—all were bound to the same lot.' (*Duc d'Aumale*, p. 67.)

Such were the troops who followed Jourdan and Moreau to the frontiers of Bohemia in 1796. Meanwhile the army of Italy, under a different chief, was animated by a different spirit. Bonaparte promised

his soldiers no austere republican triumphs, but glory and riches. He kept his word, but it was at the expense of the liberties of France. The revolutionary spirit of the army of Italy was but the mask and instrument of the future master; and Carnot, the real creator of the armies of the Republic, was himself proscribed.

It is remarkable that Napoleon, the greatest master of the art of modern warfare, did nothing to improve the organic constitution of the army. He employed the military resources of the country with consummate ability, and with insatiable rapacity; but he consumed everything that he created. The permanent military strength of France could not keep pace with his extravagant demands upon it, and the termination of the Empire was the annihilation of the force by which it had been raised to the highest pinnacle of power and glory.

The Duc d'Aumale has traced with a masterly hand, and with no injustice to the legendary soldier who gave a fourth dynasty to France, the history of that prodigious epoch. In this place we must confine ourselves to the strict muster-roll of the Imperial armies, and the lesson it teaches. The law of conscription was first established in France on the 5th September, 1798, fourteen months before the 18th Brumaire; and the statute which placed the population at the disposal of the State, as each succeeding generation completes its twentieth year, preceded the power which was to make so tremendous a use of it. From that time to the present, the youth of France just entering upon manhood, is cropped by law like the tracts in a forest set apart for annual felling; and

though the amount has varied, the principle of conscription is now deeply rooted in the law and the habits of the nation, even though it may devour a large proportion of the adult male population. The first act of the First Consul was to demand, not an instalment of the conscription, but the whole class of the year, amounting to 100,000 men, and to take severe measures against every evasion of the law. These demands and these measures increased in intensity throughout his reign. The French army attained its highest perfection after the rupture of the Peace of Amiens. A momentary truce had given breathing-time to the troops. The levies were made more regular and complete. The whole strength of the forces was 450,000 men, two-thirds of whom were assembled at the camp of Boulogne and in the neighbourhood. It was that army which threatened England, marched to Austerlitz, and perished in Spain. The Imperial Guard consisted in 1806 of only 7,000 men; in 1812 it was raised to 47,000 But what a change had taken place in that interval! The old corps, perfect in unity and in composition, had gradually wasted away; they were succeeded by provisional detachments, hastily thrown together, and imperfectly organised. Fourth and fifth battalions were formed in regiments to conceal the fact that the three first battalions had disappeared. The armies of the later Empire had by these expedients been raised to enormous numbers, but, as Marshal Macdonald once energetically expressed it, 'The men are as brave as ever, but they don't *hang together*—ils ne sont plus *cousus ensemble*.'

The short, but significant lesson to be drawn from these facts is, that the efficiency of an army is not to be estimated by numerical strength so much as by union, discipline, reliance on its leaders, and moral qualities. An army may, in fact, be weakened and encumbered by its own magnitude. It may be questioned whether there is now any general in Europe capable of directing the combined movements of half a million of men, or any Government capable of providing the *materiel*, and the means of subsistence for these enormous masses. It was one of the aphorisms of old Michel Montaigne, quoted with approval by the highest authorities of the present day when armies have grown to excessive and ridiculous proportions, 'Ce n'est pas le nombre des hommes, mais le nombre des bons hommes, qui faist l'avantage à la guerre, le demeurant servant plus de destourbier que de secours.' General Changarnier, no mean authority, has recorded his signal condemnation of the policy which seeks to arm a nation by bringing its whole virile population into the field. He maintains that three or four corps of 60,000 men each, well composed and well commanded, may make war with success against far greater numbers; and this observation is confirmed by the experience of what has been done by British troops in the Peninsula and elsewhere :—

'Let us not therefore attempt to raise the number of our soldiers to that of our possible adversaries. Even at the risk of exhaustion, we should not be sure of accomplishing it. But that is no ground of uneasiness. If it is very difficult for 3,000 men to oppose 5,000 with success, it is much less difficult for 60,000 to beat 100,000. The more the proportion rises, the

less is numerical inferiority to be feared. It may be advantageously compensated by the skill of the general and by the superior character of the troops. *Beyond a certain number, there is no good army, and no army whose supplies can be secured and whose movements can be well directed.* The army which invaded Russia in 1812 was reduced by one-half before it reached Moscow. When that gigantic and lamentable expedition had completed the ruin of our veteran legions, already exhausted by incessant wars, Napoleon succeeded in rallying large masses of recruits and led them now and then to victory. Unhappily these young troops, always gallant, always brave, but incapable of taking care of themselves, suffered more from the bivouac, from long marches, and from sickness, than they had done on the fields of battle which bore the names of Lutzen, Bautzen, Dresden, Leipsig, and Hanau.' (*General Changarnier*, p. 24.)

For three years after the battle of Waterloo France remained without an army, and the allied forces were not all withdrawn from her territory when Marshal Gouvion Saint-Cyr, Minister of War under the Restoration, undertook, in 1818, the difficult task of reorganising the military institutions of the kingdom. The peace establishment of the army was fixed at 240,000 men, to be raised by an annual conscription of 40,000 men, enlisted for six years. The reserve was to be composed of soldiers belonging to the levies of the preceding ten years, but this part of his scheme failed. No man could be an officer who had not passed a certain time in the ranks or gone through one of the military schools. The Guard was retained and consisted of 30,000 men. The Guards were the nucleus of the army, but their privileges were one of the causes which led to the overthrow of the Bourbons in 1830. Saint-Cyr was not favour-

able to the plan which had been tried by his predecessor of giving a local character to particular corps, and on this point the Duc d'Aumale agrees with him. Nothing, certainly, is more characteristic of the French army than its complete homogeneousness. The Norman, the Alsatian, the Gascon, the Provençal, and even the Arab serve in its ranks side by side, with as little distinction as exists among the crew of a man-of-war. They are French soldiers and nothing else. But we question whether the same principle could be applied with equal success in other countries. In our own army, undoubtedly, the local character of particular regiments strengthens their force, their union, and their spirit; and we think it ought to be carefully cherished in the future relations of the line with the militia and with the reserve. In Austria the motley dependencies of the Empire must necessarily be reflected in the ranks of the army. And in Prussia, where the system is based on local military institutions, the provincial colour of each particular corps is strongly marked; not only are the troops of a given district usually drafted into the same corps, but the corps are quartered in the neighbourhood of their own homes, and in time of peace rarely moved. In all these countries local habits and institutions have great hold over the populations; in France the great unity of the nation overwhelms and obliterates these distinctions.

It would weary our readers to follow the modifications which were subsequently introduced into the French military system by the law of 1832, and by other enactments. But one change is too constant and too important to be passed over in silence. The

peace establishment, based on an annual conscription of 40,000 men in 1818, was raised successively to 60,000 and 80,000 by the Government of Louis Philippe. Under the Second Empire it has always been at least 100,000; and during the Crimean and Italian wars 140,000 men. Notwithstanding this enormous drain on the country, the result has not been to increase the army as much as might be expected. And in the first moment of surprise and alarm which followed the battle of Sadowa, the French nation was startled by a declaration of the 'Moniteur' that the Government must have the means of raising the forces of the Empire in the event of war to 800,000 men, even at the risk of greatly augmenting the demands of the conscription, and lengthening the period of service. These proposals of the Government have met with no great favour in the legislature, and they have spread dismay among the peasantry. They are, in fact, opposed by some very stubborn facts, which it may be worth while to recapitulate.[1]

The measure of the military force of a country, must, after all, be its population. It is a question of arithmetic. No more men of a given age can be pressed into the ranks than the country produces in

[1] The law for the recruitment and reorganisation of the army passed on the 1st February 1868, and will be found printed in the Appendix to this volume. The principal changes it introduced were the extension of the period of service from six to nine years—five on active service and four in the reserve; and in the creation of the Garde Nationale Mobile, an institution which forms a sort of militia or landwehr, available for the defence of the territory of France. This law may be said to have placed the whole available population of France between the ages of twenty and twenty-five at the disposal of the Government.—H. R. 1870.

a given time; and it is frightful to discover how very nearly the number of conscripts called upon to serve in the army, even in time of peace, reaches to the limit of the population itself. The population of France increases more slowly than that of any other country—indeed it hardly increases at all. Amongst the most obvious causes of this phenomenon is the fact that 100,000 stout and able-bodied young men of twenty are marched off every year to the barracks or the camp—that for six or seven years at least they are unable to contract marriage—and that their more fortunate contemporaries who stay at home, cultivate their fields, marry, and rear children, are precisely those who are rejected by the conscription on account of their diminutive size, their feeble constitutions, or other infirmities.

It has been proved from the results of the last French census, that from 1851 to 1856 the annual increase of the population was incredibly small, and that in most of the rural departments there was an actual decrease. From 1856 to 1861 the total annual increase was 150,000; and the quinquennial census of 1866, just published, shows that this is still the rate of progress. It is not, however, that the births diminish, but the deaths increase. Thus, in 1845 the deaths in France were 754,701; in 1854 they rose to 992,779;—that is what the Crimean War, and the large levies of troops consequent on that struggle, cost the country in that year. M. de Lavergne has shown in an able paper read by him to the French Institute, that the levy of 100,000 men, more or less, under arms, instantly produces a marked effect on the population. When

the conscription was 40,000 men, the population rapidly increased; with 60,000 the progress was slower; with 80,000, slower still; with 100,000 it was arrested; with 140,000 (in 1854 and 1855) it positively declined. It is impossible to demonstrate more clearly that these vast military establishments reduce the vital strength of the country.

An able paper recently published by M. Cochut in the 'Revue des deux Mondes,' states with precision to what the actual resources of the population of France amount. To begin at the hour of birth. In 1843, 530,000 male children were born in France, 16,000 of whom were still-born. Of these infants only 325,000 were in existence in 1864, when they attained their twentieth year—two-fifths were already extinct. Of the 325,000 young men liable to be drawn for the army, 18,000 are below the standard height of 1 metre 560 millimetres (only five feet one inch and a half!); 30,524 are of weak constitutions; 15,988 are broken down; 9,100 are lame; 6,934 are blind or deaf—in short, no less than 109,000 individuals, or more than one-third of the whole, are rejected for physical defects. Then 57,000 are exempted as the sons of widows or old men, or only children, for moral causes. The whole available number remaining out of the 325,000 is 159,000. But from these must be deducted the draft for maritime service, and a still further allowance for those who break down in training. The residue of men really fit to bear arms out of the whole number at the age of twenty in a given year is 132,000.

We know not whether M. Cochut's figures are correct; he must answer for their accuracy. But

assuming the facts to be as he states them, this result certainly presents a frightful picture of humanity. In a bad year the returns are even worse—that is, a scarcity or a revolution makes itself felt just twenty years afterwards by the decreased numbers or feeble constitution of its offspring—'*vitio parentum rara juventus.*' A century of peace must elapse before the population of France entirely recovers from the tremendous drain of the wars of the First Empire. Possibly in other countries the case may be as bad, but in other countries we have not the same evidence of the truth. M. Cochut affirms that in Prussia, where every man is said to be a soldier, only 116 individuals out of 1,000 are found to be capable of immediate service. If this be so, cause and effect react on one another. The conscription checks the population by carrying off the best portion of it at the age at which the men would otherwise marry, and the population therefore becomes less able to support the conscription. If the value of the earnings of 390,000 men (the amount of the French army in peace) be taken at only two francs a day per man, a very low average, the loss to the country of productive labour is *about eleven millions sterling per annum.*

These are the immediate practical results of enormous standing armies, levied by conscription, on population and wealth. Their indirect consequences are incalculable; and with these facts before us we cannot but pause a moment to remark the barbarous effects of a system of policy based on mutual fear which compels the most civilised nations of the

continent of Europe to submit in peace to these unparalleled burdens, more fatal to them, we really believe, than the incessant but limited contests of their forefathers. And yet we are told that the highest achievement of *geist*, intelligence, organisation, and government is to augment even these military preparations, by enabling the State to turn every citizen who breaks bread between the ages of twenty and thirty-five into a soldier. The inventor of that system and the promoter of that policy appears to us to deserve to be regarded as the great enemy of mankind.[1]

It was argued by Mr. Cobden that, after all, the most powerful nations in war are not those which

[1] It is curious to place side by side with these facts the amount of the British and Native forces by which we hold India. In the year before the mutiny the forces were—

European force, including all British officers of native regiments	45,000
Bengal native army	160,000
Madras native army	57,265
Bombay native army	38,850
Total	301,115

In 1867—

European troops	61,000
Native armies in all the Presidencies	122,000
Total	183,000

Thus the British establishment has been increased by 16,000 men, while the native establishment has been reduced by 134,000 men. Therefore a considerable reduction has been effected, and having regard to the immense area occupied and defended by these troops it may be doubted whether reduction can safely be carried further. The highest military authority in India is clearly of opinion that it cannot. Contrast these figures with the enormous military establishments now existing and contemplated in Europe!

maintain enormous military establishments in time of peace, since these establishments tend to restrict the progress of the people both in numbers and in wealth, and consequently when an emergency calls their forces into action the resources of the country are inferior to what they would otherwise have become. In the late civil war in America more men were raised and more money was spent than in any previous war, although at the outset the Federal Government had no standing army, and only half-a-dozen ships of war. To this it must now be added, that in spite of the large chronic demands of the French army on the population, the result is not commensurate to the cost, and that after all France was not in a condition to engage in a great European war without a considerable addition to her forces.

The efficient strength of the French army for 1867, including the staff, the gendarmerie, and the military train, was 389,604 men, of whom 23,105 were officers, 70,850 non-commissioned officers, 26,374 unclassed companies, musicians, &c., and 269,275 private soldiers. From this number 80,000 must be deducted for home garrisons, depôts, and the force serving in Africa. A further deduction must be made of at least one-seventh for the raw conscripts of the year who have recently joined, and of another considerable fraction of men entitled to their discharge as having served their time. By calling up the whole reserve of the contingents, a portion of which are allowed to remain at home, the nominal strength of the army could be raised to 600,000 men, but the actual strength was very far below that figure.

As the men drawn for the conscription were allowed by the system then in force to commute or buy off their actual service by paying a certain sum to the military chest, a further deduction must be made for those who pay their debt of military service in money and not in person. We have before us a table of these *exonerations*, as they are termed, which was compiled for the Superior Commission on the dotation of the army. From 1856 to 1865 the average annual number exceeded 20,000 men, or one-fifth of the whole conscription, in years of peace; but in 1859 and 1860, when the army was on a war footing, and the conscription was raised to 140,000, the number of *exonerations* exceeded 44,000, or nearly *one-third of the whole* contingent. This deficiency in men was in part made good by re-enlistments of men entitled to their discharge; but the re-enlistments are in most years considerably less numerous than the exonerations, especially in time of war. In the opinion of the best military authorities of France this system has been extremely injurious to the army and prejudicial to the resources of the country; and although it has been defended by the Emperor, as his own especial creation, it will probably be abandoned in the course of the present year. In a moment of danger what the State wants most is men, not money; and the old system of *remplacants* had the advantage that every man drawn was actually represented by a combatant, not by a bank note.[1]

The result is that, as General Trochu has pointed

[1] The system of exonerations was abandoned in 1868, and is not now in force.—H. R., 1870.

out with great force and authority, in the two last wars of the Crimea and of Italy, France could only send to the field and maintain by reinforcements, *one army not much exceeding one-fourth of her nominal effective strength.* And from the inquiries we have made we have reason to believe (although the assertion will excite surprise and may perhaps be questioned), that in 1866 during the campaign of Sadowa, and again when the Luxembourg question was supposed to threaten war in 1867, the Emperor Napoleon could not immediately have sent above 150,000 men to the Rhine, and could not, without a delay of several months, have raised a second army to support the first in case of a check or to act upon a separate line of operations. No doubt if the military spirit of the French nation were roused, great sacrifices would be made, and this estimate might be largely augmented. But we are speaking of what can be done with the military institutions of France as they existed in 1867; and we are not surprised that the Emperor himself and the highest military authority in France should have arrived at the conclusion that they were not adequate to meet on an equal footing the state of things which the system of the Prussian armies and the consolidation of Germany has produced in Europe.[1] The position of France in respect to her

[1] According to the *Almanac de Gotha* for 1870, the army of the North German Confederation is divided into 13 *corps d'armée* or 27 divisions, composed of 54 brigades of infantry, 28 of cavalry, and 13 of artillery. The strength of these armies on the war footing is 371,680 infantry, 46,137 cavalry, 41,439 artillery with 1,272 guns, 8,030 pioneers, and 44,540 service of the train. The whole regular army consists therefore of 511,826 men and 1,272 field guns. But in addition to this force, each regiment has a depôt battalion, and these troops of reserve form a

army is somewhat analogous to our own in respect to the British navy, when we learned a few years ago, that the naval forces of France were equal, and in some respects superior, to our own. That was not a state of things in which any Englishman would acquiesce, for the safety of his country depended upon it; and we acted accordingly.

These considerations suffice to account for the deep anxiety with which the subject has been discussed in France. In the absence of a free Parliament, and with a periodical press in fetters, it is only by the publication of books and pamphlets that public opinion can be expressed and enlightened. A multitude of these productions have therefore appeared, but amongst them all, that which is attributed to General Trochu, is by far the most remarkable. Although small in size and possessing some of the attractions of a pamphlet, for it ran through sixteen editions in three weeks, this is no fugitive publication. It is the result of the observations and the reflection of a life. It embodies a good deal of the blunt wisdom and keen sense of Marshal Bugeaud, in whose staff General Trochu learned the art of war. We have seldom read a book so succinct and so wise. There is not a page in it which does not contain some principle one would wish to fix for ever in the memory; and we do not remember that any modern writer has

body of 180,672 men. There is also a further garrison reserve of 265,082 men. Adding to these forces 15,000 officers and some supernumeraries, the grand total of the German armies on the war footing amounts to 977,262 men. And to these forces must be added the armies of Bavaria, Wurtemburg, and Baden, which are now placed by treaty under the supreme command of Prussia in time of war.

treated the art of war, as it now is, with so much practical sagacity and elevated feeling. Those who are interested in military affairs, either in the shape of command or administration, will find in it the true principles on which modern armies have been reorganised. They will find a brave and unsparing exposure of many of the defects of the French army, but which are certainly not peculiar to that army only. And they may learn from it much that is applicable to all armies in all countries.

General Trochu is not, like the Duc d'Aumale and General Changarnier, a distinguished officer withdrawn from the army for political reasons. On the contrary, he has never ceased to be on active service. He served on the staff in the Crimea; he commanded a division in Italy; and if war were to break out in Europe, he would doubtless play a part in it, in spite of the unpopularity and even hostility which the uncompromising frankness of his Essay excited against him. Nevertheless, fearless of censure and the resentment of the powers that be, he thought it necessary to lay bare the weakness and the sores of the service to which he is deeply attached; and we cannot say that he has spared anyone in this heroic resolution. At a period of transition in the structure and functions of armies, he avowed boldly that there is no other remedy but publicity for existing imperfections and abuses. The confidential appeals previously made by him to the War Department had failed to produce any effect.

The fundamental principle of every army, according to General Trochu, lies in what he calls its *motive* force and its *mechanical* power. Its motive force is a

moral element, sustained by the spirit, patriotism, and bravery of the nation; its mechanical power is the result of its military structure and arrangements. Some armies excel in one respect, some in the other. An army which should combine them both in the highest degree would be eminently formidable in war and almost invincible. In the French army the motive force is intense, and it is rendered more intense by the close assimilation or identity of the army with the nation. Whatever tends to render this relation more intimate, strengthens the army; whatever tends to sever the army from the people, weakens it. That is not the case with all other armies, and especially it is not the case with our own. Every army has its idiosyncrasy and national characteristics. General Trochu speaks with great respect of the British army, and quotes with approval Marshal Bugeaud's familiar saying, 'The British infantry is the most formidable in the world; *happily there is not much of it.*' But he adds with truth, that as armies faithfully represent the merits and the defects of their respective nations, they must be governed and organised on their own distinct principles.

The merit of the system of conscription in the French army is the constant renewal of intercourse which it maintains between the forces and the people. Every year nearly 100,000 citizens enter its ranks; every year as many leave its ranks, impressed with its discipline and its spirit, to resume their civil occupations. The policy of the Emperor has been, for military and political reasons, opposed to this system. He has encouraged as much as possible the

re-engagements of the men at the expiration of their period of service, partly from the belief that a trained soldier of twenty-seven was a better combatant than a recruit of twenty-one and partly because these professional soldiers learn to look to the army alone as their means of livelihood, and are therefore less likely to share the popular passions of the day. The money received from conscripts who have bought themselves off has been spent in promoting these re-engagements by premiums and higher pay. General Trochu combats this system. He says that an old soldier should not be an old man but a young man who has learned his business; that the true spirit of the French army is to be found in its trained recruits; and that the older men who have re-enlisted for money, and who remain in the army because they have no other calling in life, become 'dodgers,' malingerers, and very often drunkards. All the systems which have been discussed and adopted in France for the last fifty years have necessarily been *peace systems*, not uninfluenced by political motives bearing on the domestic interests of the Government. But the question is whether the army has been trained and fitted *for war*? Whether it can be reinforced and augmented by a competent reserve in war? To these questions General Trochu reluctantly gives a dubitative, we might even say, a negative answer.

The following observation is of universal application:—

'Discoveries made in those sciences which are the handmaids of industry and the arts of peace, have always been used with advantage by arms. One of them, the most important of all, the invention of gunpowder, determined the

forms of modern warfare. But formerly these inventions appeared from time to time in the lapse of ages. They were slowly tried and perfected by successive generations. In our time, science is no longer content to be the auxiliary of war: she aspires to be its principal agent. Discovery succeeds discovery with a rapidity which bewilders the mind, throws governments into perplexity and their budgets into confusion, and which will throw families into mourning, for all these inventions have invariably the same object, which is to kill the maximum of human beings in a minimum of time. An opinion is gaining ground that these irresistible mechanical improvements will bring armies, in the field, to be mere masses working engines which are to slay the enemy. That composure which permits of observation and reflection, that glance which chooses the decisive moment, that bravery which executes a movement and overcomes an obstacle, would then be out of date.

'Just the reverse is true. All these faculties must be multiplied, all these qualities must be augmented, to work on fields of battle the same problems as of old, rendered more difficult and more perilous.

'It is essential to purge the minds of our troops of these notions and paradoxes which lower the part they have to play. Do not allow them to relax in the exercise of those virtues which are the soul of great effort. Let them be persuaded that the greater and the more painful are the sacrifices required of them by this improved art of slaughter—an unexpected result of superior civilisation—the louder must be the call of honour and patriotism in the soldier's ear.' (*Trochu*, p. 97.)

The first condition of a good army on which General Trochu insists, as may be inferred from the foregoing sentences, is to raise its moral and intellectual standard. It is idle to inflame the imagination of troops by a fanciful conceit of their own superiority; that delusion may be rudely dispelled by the resistance of

a powerful enemy; the qualities on which an army has to rely are those which can be found in its own ranks. The unity and mutual reliance of the forces in the hour of danger, the knowledge the men have of the officers and the officers of the men, the moral influence which leads men to overcome their natural instincts, and a general acquaintance with the true principles of war, are the essentials with which a great commander seeks to imbue every portion of the troops under his command. But this result is not to be attained by a minute attention to drill and the mechanical elements of an army. The exercises of troops in time of peace, says General Trochu, give them absolutely no conception of a real struggle in real warfare. And if nothing has been done to bring about that higher education which is the soul of a good army—if troops are marched to meet the enemy without a thorough knowledge of their generals, and without being known by their officers, the result is incoherence in the operations, accident in the course of events, and disappointment in the result. This remark is applicable to other things than armies: it is the secret of all government of masses of mankind, in parliaments, in enterprises, and in industrial operations. Mechanical combination is nothing without unity of motive power.

In an army in which promotion depends on merit and not on purchase or mere seniority, every step of advancement is open to the criticism of the whole corps, and probably if the men elected their officers the choice would at least be a just one. But, we venture to add, that the moral tone and professional value of the French army have been impaired by the

temptation to convert it into a political instrument. Many a worthless officer has had his debts paid out of the privy purse and got his promotion, because, whatever his vices or defects might be, they only rendered him a more devoted and subservient tool of the Imperial Government; but advancement bought at this price may cost a man the respect of his comrades and the confidence of his men. General Trochu complains that the French soldier unwillingly pays even the customary external marks of respect to his officers; the *prestige* of military rank has become extremely faint; and, in some instances, the *prestige* of superior merit or moral worth is altogether wanting. If faith in *rank* has died out in the French army, its influence can only be supplied by a very high standard of military and moral excellence.

Those who have studied the formation of the Prussian armies incline to the belief that from the advanced education of all ranks in that country, and from the peculiar local organisation of the several corps, they possess these moral elements of military strength in a very high degree, insomuch that when the Landwehr is called out every man knows his place and keeps it. Moreover, although there is much of the democratic element in the Prussian army, it is officered and commanded on aristocratic principles: it has none of that spirit of equality which, as in France, seeks the officers in the ranks. On the contrary, in Germany social rank and personal station lend additional force to military authority. If this be so, it is an important condition of success in war. General Trochu is of this opinion,

and he has not overlooked the advantage it may give to the German armies.

In Prussia and in Russia the active army in time of peace as in time of war is formed into several corps, each composed of divisions, brigades, regiments, staff, depôts, with their own officers and their own *matériel*, all constantly and permanently acting together, with the proper reinforcements in reserve, so that from one day to another the whole body is ready for action. This species of military organisation may have some inconveniences, as what has not? But it would be superfluous to enlarge on its incalculable advantages for the purposes of war, when it has penetrated the habits of nations and of armies—the advantage of keeping alive the military spirit, by the ties thus formed in all ranks, between those who command and those who obey—the advantage of a condensation of moral force and of experimental knowledge of every detail of a complicated mechanism—the advantage of rapidity of concentration, concert and energy in execution, when the hour of action is come—advantages of all kinds in *the preparation of war*, which can thus be carried on, without putting a whole country and a whole army into agitation, by violent and multifarious movements, which have the serious evil of disclosing long beforehand the efforts made. With the exception of some great centres like Paris, Lyons, and the camp of Châlons, where the troops are agglomerated rather than organised, the elements of war (in France), both personal and material, are isolated and dispersed to an infinitesimal degree. There are colonels so absorbed in the multifarious duties of administering and commanding at head-quarters, that for months they have not seen, or been seen by, all their detachments. As for generals commanding divisions or subdivisions, the distance and the difficulty are of course still greater.

Organised concentration, the interchange of sentiments and notions, intercourse between the different branches of the service, a common education, combined manœuvres conformable to actual warfare, are out of the question. The thing is impossible. And when war breaks out, all this has to be

created and is created, in presence of the enemy, with endless perplexity and confusion which are fatal to the coolness and cohesion of the army. (*Trochu*, p. 131.)

Apply these and similar principles to what the French call the Administration of the army, and we the Commissariat. That was the weakest part of our own system in the Crimea, and we learned by melancholy experience how fatal may be the consequences of a failure in this essential branch of the service. But General Trochu tells us that in his opinion, based on recent observation and experience, things are even now not much better done in France. The art of supplying an army in the field cannot be learned in time of peace. In peace the delivery of contracts is perfectly simple, regular, and easy. In war everything—time, place, and demand—is urgent, difficult, and irregular. The only method of dealing with so many unforeseen contingencies is not by military routine, but by a ready and complete knowledge of business. At present all the officers of the French Commissariat have served for years in the army itself; the heads of the department, or intendants, are superannuated generals. The consequence is that these persons know nothing of the operations of trade by which alone supply can adjust itself to demand. During the Italian campaign of 1859 the French troops were often without bread in one of the most corn-bearing regions of Europe. Biscuit was equally deficient. An attempt was made to supply the place of these necessaries by polenta, which the men would not eat because they did not know how to cook it! It is the old story of the green coffee. The commissariat officers knew nothing

about buying and selling food, they could only distribute it. On these grounds General Trochu arrives at the conclusion that in the event of a great and prolonged war recourse must be had to mercantile enterprise, and that a civil contractor must be charged with the divisional supplies, under the superintendance of the military authority. This is what actually occurred to the French army in the Crimean war. Their commissariat, like our own, was strained to the furthest point without effecting its object; when a great commercial house at Marseilles undertook the supply of provisions with complete success, and restored abundance to the expedition. Nothing is more characteristic of vulgar ignorance than the prejudice against contractors, who are said to enrich themselves at the cost of the public. No doubt they enrich themselves; they ought to enrich themselves, if they succeed in performing a critical and complicated service; but at the same time they save the State and the army from far larger expenses and greater chances of failure. It is a mark of the wisdom and impartiality of General Trochu's mind that he is opposed to exclusive military establishments, and favourable to the introduction of the civil element as an important ingredient of military power in modern warfare. That is a great truth which the late Duke of Newcastle was one of the first to discover; and although the novelty and difficulty of his situation at the outset of the Crimean war prevented him from giving as full an effect to it as he desired, no man was more convinced of the efficacy of the principle. In the French army the doctrine is still more novel, because the military spirit of that coun-

try is more absolute than it is here; but experience is gradually demonstrating that the power of a country in war depends to a considerable extent on the art of bringing its civil resources to bear on military objects.

By common consent the infantry of an army is its most essential and important element. General Trochu calls it the '*instrument de la force et de la durée.*' The foot-soldier of the French army, carrying on his back a weight of 35 kilos. or 75 lbs., which is *more than one-third of the regulation burden of a camp mule,* has to march, to watch, to work, and to fight, for the support and defence of the whole service. Yet how is the infantry of the line formed? It is what Mr. Bright would call the *residuum* of the conscription. The artillery and engineers have the first choice, as they must have men of physical strength and superior intelligence. Then the big men are taken for the heavy cavalry regiments. Then the most agile and hardy men are selected for the light infantry corps (chasseur à-pied): and when the regiments of the line are formed, the best men are drafted out of them to serve in the Imperial Guard, or to form the two picked companies of each battalion. What remains after all this selection is of necessity the dregs of the whole mass. The peculiar system of the present Emperor has been to form and foster picked bodies of troops, at the expense of the rest of the army. No error can be more fatal. The forces are weakened by continually subtracting their strongest ingredients; and the army, as a whole, loses that uniform solidity which is essential to great operations. Against this whole system

General Trochu raises his voice. He would throw back into the line all these crack corps, and do away with distinctions which are no longer justified by a difference of arms. But he would attach to each battalion two platoons of sharpshooters or picked marksmen, to cover its flanks and take up positions admitting of accurate fire. No accurate fire can be had, he contends, unless the man who aims his rifle at the enemy has, or thinks he has, a certain amount of cover. In the open field all men fire at random. To obtain cover for skilled shots is an essential condition of modern infantry manœuvres. The Americans in the late war carried this art to a high pitch, even by scooping out patches of earth in the ground, and by their great dexterity in woodcraft.

General Trochu entertains the opinion that cavalry, far from losing its importance in modern warfare, will increase it; but only on condition of adapting itself to the altered conditions of the age. Cavalry is the instrument of swiftness in war, and for that purpose everything must be done to make it light and active. A horse made to carry from eighteen to twenty stone on his back is utterly unable to perform the duties required of the animal. Yet the French cavalry carry from seven to eighteen pounds more than our own. To select the light weights, and men used to horses, to abolish the heavy troopers, with the helmets and cuirasses, to provide each squadron with light carts to carry a portion of its baggage, to relinquish the musquetoon for the revolver, are the obvious remedies, which have often been suggested, and which are now backed by the high authority of General Trochu.

It was a maxim of the Emperor Napoleon I. that to preserve the superiority of an army in war the system of tactics requires to be changed every ten years. But, on the contrary, nothing in this age of change and improvement has undergone so little alteration. At the time when General Trochu's essay was published the exercises and manœuvres of the French line were still those of 1791; indeed they were introduced and copied from the drill of Frederic II. after the battle of Rosbach, and we doubt if they have since been materially altered. In process of time these regulations, published and amended in a thousand ways, have reached an enormous bulk—some 846 articles of evolutions, most of which could not be executed in actual war. But they are still essentially the regulations of Potsdam, devised by Leopold von Dessau soon after Frederic had adopted the iron ramrod, which was the needle-gun of the last century. The minuteness and complexity of these details exceeds, we are informed, all belief:—

> They were invented at the time when troops could advance in procession to take up their ground in safety, even at a small distance from the enemy; and when every portion of a long order of battle, closely united and acting together, manœuvred with complete uniformity. But now that the progress of artillery and musketry have doubled or tripled the range of destructive weapons, in front of the lines; now that, on a field of battle, bodies of men are not safe anywhere; now that the whole secret of war lies in *regulated swiftness*, *order*, and *silence* (this last condition greatly wanting among French troops); now that the inflexible rigidity of the old Prussian line of battle has been superseded by elasticity, mobility, and the relative independence of its component parts, is it not clear that simplicity and clearness in theory, with facility and rapidity

in execution, are become the absolute law of modern manœuvres and tactics? (*Trochu*, p. 216.)

To this most striking and forcible remark we must add the evidence of General Morand, an excellent officer, who served with distinction under the First Empire:—

Our present manœuvres cannot, without great danger, be made in presence of an enemy. If employed, the consequence would be, as the consequence has been, *the massacre of whole battalions*. These manœuvres are also injurious, because the study of them diverts the mind of an officer from the true objects of war. Generals have been beaten because their heads were full of nothing but these nonsensical forms. The whole drill should be reduced to a few pages.

It is important to bear in mind that nothing in the world is so little like actual war and an actual battle as the artificial preparations for it and the books written about it. That is what General Trochu gives as the result of his experience, and he holds very cheap those dilettanti generals and carpet knights who make campaigns on their library tables. Nor has he a much higher opinion of popular enthusiasm as an element of military success. All the eagerness of the start counts but little during the heat and burden of the day, and far less still when fortune ceases to smile and reverses have to be borne. In support of this opinion he quotes the following passage from Marshal Bugeaud's reminiscences, which is so remarkable that we must give it entire:—

I served in the Peninsula, said the Marshal, for seven years. I sometimes beat the English in isolated mountains and detached operations, which, in the rank I then held, I

was able to propose and to direct. (The combat of Ordal was one of these occasions.) But during this long warfare, I am sorry to say that there were but few general operations in which the British army had not the best of it. The reason was obvious. We almost invariably attacked our adversaries, without the slightest reference to past experience, in a manner which generally succeeded against the Spaniards and which generally failed against the English.

They habitually occupied a well-chosen defensive position, with a certain elevation of ground, showing only a portion of their strength. The cannonade began. Then, in hot haste, without waiting to study the position, or see how it could be turned, on we rushed to take the bull by the horns. At about a thousand metres from the British line, our soldiers began to talk, and hurried forwards with a slight degree of confusion. The English, silent, arms grounded, looked in their impassible steadiness, like a long red wall, which had a good deal of effect on our youngsters. The distance became less. The troops began to cry "*Vive l'Empereur! En avant à la baionnette*," and to wave their caps on their muskets. The march became a run; the ranks were somewhat broken; the agitation swelled to a tumult, and a good many shots were fired. The British line, still silent and immoveable, still with grounded arms, though we were but 300 metres off, seemed not to perceive the storm about to reach it. The contrast was striking. More than one of our fellows began to think, within himself, that the enemy was very slow in firing, and that his fire, when it came, would shortly be very unpleasant. We felt less ardent. The moral influence, irresistible in war, of that composure which seems to be undisturbed (even when it is not so), over disorder intoxicated with noise, weighed upon us.

At this moment of painful suspense, the English wall presented arms. An impression they could not define riveted to the spot many of our men, who were beginning to open a dropping fire. The fire of the enemy, in perfect unity and precision, mowed us down. Struck back, we receded to

recover our balance; then first three formidable *hurrahs* broke the silence of our adversaries. At the third cheer they were upon us, driving in our disorderly retreat. But to our great surprise, they did not urge their advantage beyond a hundred yards, but fell back on their lines to await a second attack. The second attack, with reinforcements, was generally made, but made with the same result and fresh losses. (*Trochu*, p. 240.)

There is reason to believe, from the conduct of the French troops in the wars of the present generation, that these peculiarities in their mode of attack have not altered. They are due in the first instance to the nervous, high-spirited temperament of the men; but they have been increased, rather than counteracted, by the influence of the campaigns in Algeria, the great school of modern French arms. The loose formation and desultory warfare of Africa against the Arab tribes have given to men and officers a high degree of individual resource and self-reliance, but have weakened that severe discipline and close connection which is essential to regular movements against an enemy in line of battle. French soldiers take up their ground with extreme promptitude and gallantry; when the fire of the enemy begins to tell upon them they rush forwards with irresistible ardour, but with some degree of confusion. These impetuous movements are ill-timed and inconvenient. They anticipate and embarrass the proper operations of war; and in the event of a check inflicted by an enemy under stricter discipline and control, they might be followed by the most disastrous consequences.

It would be presumptuous in us to attempt the task, for which we are by no means qualified, of

criticising the French army; and in these remarks we have said nothing which has not been laid down by the experience and authority of its own officers. In spite of the imperfections which have been pointed out, the confidence we feel in the superior quickness and aptitude of the French for war is so great, that we entertain no doubt the army would speedily attain that preeminence for which it has ever been so famous. At the same time it cannot be denied that the present condition of the armies of Germany, united by federation or by treaty to the Crown of Prussia, renders them more formidable antagonists than they have ever been before. In point of numbers, the united population of Germany, including the States south of the Main, is superior to the population of France; it increases more rapidly; and the uniform obligation of military service during a term of nineteen years, enables the German rulers to throw a larger proportion of their subjects into the ranks of the army. In point of physical size and strength the advantage is on the side of the big Teutonic race, over the Celt, the Latin, and the Gaul. In point of field armament the Prussians forestalled the other armies of Europe in the introduction and use of a breech-loading rifle, but this cause of inequality has disappeared since the introduction of the Chassepot and the Snider guns. In horses, the resources of Germany are inexhaustible; and to this element of strength must now be added a very complete system of railroads and telegraphs. The tactics of the French infantry of the line are, as we have seen, complicated and old-fashioned; those of the Prussian army have been the subject of incessant

study and improvement from the battle of Jena, when their old system utterly broke down, to the battle of Sadowa, when their new system culminated in victory. The German armies are in the highest state of efficiency which can be reached, by scientific preparation for war, by concentration, by compact discipline, and by forethought. The Bohemian campaign had been in preparation for six years, and the result justified the care bestowed upon it. The army knows to whom it has to look—men like General Roon and General Moltke to plan its operations, leaders like the Crown Prince and the Prince Frederic Charles to command it in the field, inspire the troops with a confidence strengthened by past experience and habitual deference to supreme authority. In the French army we cannot say that the present aspect of affairs is equally satisfactory. That great evolution of military reform which the Prussians have accomplished, is, in France, incomplete. The Imperial Government does not possess the unequivocal or undivided confidence of any class of French citizens. The Emperor, whose will is the only tangible form of authority, does not boast of high military talents, and has been unfortunate in several of his military experiments. After him, there is in France no general of such indisputable preeminence and authority that he could at once give the vigour and unity of paramount command to the whole military system. The experience of the First Empire abundantly showed how dangerous it is to divide the command of the army among officers of rival pretensions, even when the supreme head of the State was a Napoleon. There is, therefore, at present in France nothing of

that strict unity of command and complete preparation for war which is believed to exist beyond the Rhine. On the contrary, opinions are divided in high quarters on many essential points. And the inevitable consequence is, that where the highest authorities are not completely resolved upon a course of action, a certain tinge of irresolution penetrates to the regimental officers, and the discipline and cohesion of the whole mass is perhaps somewhat relaxed. These are not favourable conditions to take the field against a powerful and well-advised enemy.

It is far from our intention to insist upon, or in the least degree exaggerate, these apparent shortcomings. On the contrary, we are confident that upon a great emergency the French nation will, as of old, put forth an amount of energy and resource capable of surmounting these and far greater perils.

The most favourable result that we can venture to anticipate from the enormous military establishments of the present day is that they may render offensive war too difficult and perilous an enterprise to be undertaken with any prospect of advantage and success. For defensive purposes no country can be too strong; and as long as the power of resistance is in most countries greater than the power of attack, it may reasonably be inferred that war will not be made. The moment the defensive weapon is converted into a weapon of aggression it becomes a curse to the world. Unhappily, popular passions, military pride, and political interests supply motives of action in which reason has no share. In the present state of the great continental armies, in the

present temper of the continental governments, and in the absence of any recognised body of public engagements, we have, it must be confessed, but little confidence in the permanence of peace; and in presence of the altered condition of Europe, no man can be surprised that the efficiency of the military institutions of France has become the most absorbing subject of interest to that great people.[1]

[1] It is unnecessary to remind the reader that these remarks were written in 1867, three years before the occurrence of the present war. In the interval Marshal Niel succeeded in reorganizing and re-arming the French army, which had suffered greatly under the feeble administration of his predecessor Marshal Randon.

RIFLED ORDNANCE IN ENGLAND AND FRANCE.[1]

[*Reprinted from the* EDINBURGH REVIEW, *April* 1864.]

THESE Parliamentary reports, and the meritorious publication of Sir Emerson Tennent, suffice to give the reader a very exact notion of what has been spent, produced, and invented by England in order to solve the great problem which perplexes the military Powers of the world. About twenty years ago, the manifest improvements effected in the structure and manufacture of small arms appeared to threaten with a total overthrow the ancient superiority of field guns and heavy ordnance. The Minié rifle, as it was called in the first instance, from the name of the ingenious inventor of the new form of projectile which it carried, seemed to have reduced to a far narrower scope the part heretofore borne by field artillery in war; and in an article of the 'Moniteur,' attributed to the Emperor Napoleon himself, the term 'hand artillery' was not unadvisedly applied to those new and powerful weapons, which

[1] 1. *Reports from the Select Committee on Ordnance, together with the Proceedings of the Committee, Minutes of Evidence, Appendix and Index for* 1862 *and* 1863. Ordered by the House of Commons to be Printed. July 1863. 2. *The Story of the Guns.* By Sir Emerson Tennent. London: 1864.

appeared likely to supersede guns of heavier metal. With a rifled musket a skilled marksman can send a ball with precision to a distance of 1,200 or 1,300 yards—a distance equal to the first graze of a cannon-ball from the smooth-bore field-gun formerly in use, and double the range of the same gun firing canister or case-shot. But in addition to this advantage of the rifleman over the artilleryman, the fire of the rifle is beyond comparison more accurate than the fire of the smooth-bore cannon. It was therefore obvious that a field battery, which required for the full complement of its half-dozen guns and their carriages and ammunition no less than 200 horses and 200 men, must in most cases produce on the field of battle much less positive effect than a single company of 100 skilled riflemen. As skirmishers, or under cover of the nearest hedge, or wood, or wall, the hundred rifles could with ease pick off their 200 antagonists. The battery could only return their fire by six comparatively ill-directed shots against an unseen enemy; whilst its own position, the horses, the caissons, and all the picturesque splendour of a well-appointed field-gun, exposed it to the unerring fire of these scattered assailants. Like the lion in the fable, the king of the forest might exhaust his strength in vain efforts to shake off or escape these gad-flies of battle, stinging him to death.

It is true that the fire of artillery is still formidable to masses; but the first result of these changes has been to modify the tactics of Europe, and to cause the deep formation previously used by continental armies to be abandoned: moreover, the effect of the

fire of modern rifles is to compel guns to pass out of range of the denser bodies of troops. Case-shot or canister at short distances are still no doubt to the advantage of artillery, but the range of hollow shot from the old field-guns was extremely limited and its direction uncertain. To this it must be added that artillery is of all arms the most costly, the most cumbrous, and the most difficult to handle on broken ground or under adverse circumstances. To maintain the ascendancy of guns, it became indispensable to construct cannon which should be to the old field-pieces what the Enfield rifle is to Brown Bess. To those who are at all conversant with the subject it is superfluous to remark that in order to give rotation to elongated projectiles in their flight by means of grooves cut spirally down the length of the bore, either the projectile itself must have projections on its surface to fit into these grooves—and this is the French system, as well as that of Cavalli in Italy and of Wahrendorf in Germany; or else a portion of the projectile must be of soft material, so that like the Armstrong shell, coated with lead, the missile is forced by the explosion into the grooves of the gun. All the systems of rifled ordnance may be reduced to one or the other of these two principles; and the selection of the arm best adapted for the service is the great problem which every military Government has had to deal with as best it could: we believe that it has been satisfactorily dealt with by England and France, but by these Powers for field-guns only. But we shall not attempt in the following remarks to enter upon the subject of German ordnance, tried for the first time in Sleswig, where the

Danish smooth-bore cannons were unequally opposed to the Prussian rifled guns. The Russian Government has made prodigious exertions to remodel its whole artillery, but we believe in the main they have adopted the French system. As for heavy ordnance, in all its varieties,—battering guns and guns of position, coast defences and naval guns—it is still, to say the truth, in a state of probation and experiment: but we shall endeavour to show the point which these inventions have really reached in both the great States of Western Europe.

The heavy guns used by the Americans at the siege of Charleston, in their batteries and in their iron-clad ships, must still be classed in this experimental category. The hooped and rifled guns with which several of the vessels now in commission in the French navy are at this time armed, can only be considered as an expedient, which has enabled the French Government to make use of an enormous store of iron guns at very little expense: if the French had set to work to construct an entire system of artillery new in all its parts, as has been done in this country, and in no other, they would probably have produced a more perfect arm. But even in our own service, the 70 and 100-pounder Armstrongs which have been distributed among our ships, are admitted by everybody not to be the final and satisfactory result of our experiments in naval armaments. It may therefore be said, that modern rifled artillery has only been entirely adopted and introduced into the field service of the French and English armies. The structure and form of heavy guns and their projectiles is still under discussion: France has rifled

her old brass guns and hooped her old cast-iron guns with steel with considerable success: England has pursued a most costly series of experiments with the heavy guns of Sir W. Armstrong and others, but at the time when these remarks were written the old smooth-bore 68-pounder was still regarded as the most effective ship gun. The results of these experiments, which have been purely empirical, and directed by no certain principles of science, are negative rather than positive. They have taught us that certain things are to be avoided. They have not yet demonstrated what it is safe to adopt. These general observations should be borne in mind by the reader of the following pages.

Sir Emerson Tennent's interesting volume put the public in possession of all that had been done in this country for the improvement of British ordnance at the time he wrote. Having served in early life in the artillery of a foreign army, the author has the advantage, not always shared in by those who have written on this subject, of knowing what he is talking about—enough at least to escape palpable errors, and to prevent the most important parts of the question from being overlooked or undervalued. Not unversed in authorship, Sir Emerson has presented us with a plain and lucid narrative, which serves to guide the reader, however little versed in these controversies, from the first effort of Sir W. Armstrong to the point reached in 1864. The whole book is clear, interesting, and intelligible, even down to the *desiderata* to be supplied hereafter.

It was established before the Ordnance Committee of 1863 that the sum expended between 1858 and the

month of July in the later year, for the construction of the modern artillery, both in the workshops of the Elswick Company and in the Royal Gun Factory at Woolwich, amounted to 2,539,547*l.* 17*s.* 8*d.* A large sum no doubt, and we do not venture to assert that the whole of it has been wisely expended, according to the lights we now possess. But no one doubts that it was honestly spent in a laudable endeavour to obtain, in the shortest possible time, the best guns and projectiles that could be made for the country. There have been moments in the last few years when this question assumed an intense and urgent importance—when the maintenance of our authority and even the defence of our coasts might turn upon it. When it is considered how much depends on the implements we place in the hands of our seamen and our soldiers, it is not too much to say that the Government would not be justified in neglecting any means of procuring the best that can be devised. The question of expense is therefore one of secondary importance, provided the money has been judiciously applied. Moreover, if we have spent twelve millions on the fortification of our dockyards, which have made Plymouth, Portsmouth, and Portland some of the strongest marine fortresses in Europe, that money is spent in vain as long as these forts are not perfectly armed.

Nor, indeed, can it be said that this expenditure of upwards of two millions and a half in five years on this branch of the national defence is excessive, when it is remembered that the whole of the old material has been thrown aside, that an entirely new system has been created, with an immense amount of expe-

riments and imperfect attempts, that new workshops had to be erected, with tools of the most costly and original character, and that a large body of highly intelligent artisans had to be educated to this service. The result is that in February 1863, 2,370 guns of the new pattern had been distributed to the army and navy,[1] 799 of which are 100-pounders, with their carriages, appurtenances, and ammunition complete, and a large store of the peculiar projectiles adapted for these guns has been accumulated in the arsenals. Attacks have recently been made on the Government for not continuing to produce these guns and projectiles at the same rate: but such attacks are most inconsiderate. It is of importance to have a sufficient supply of the best material of war at any given moment; but it is not less important not to encumber ourselves with enormous stocks of these articles, which may be superseded by better inventions before the time arrives for using them. We remember to have heard the late Sir George Lewis, when he was Secretary for War, express precisely this opinion, and strongly deprecate the excessive increase of stores, which might after all tend only to obstruct the introduction of further improvements. The price of the manufacture of the articles produced by the Elswick Company decreased 50 per cent. between 1858 and the month of March 1863, by reason of the greater familiarity of the workmen with their trade; and it is creditable to the Company that it continued to reduce its prices as fast as it had the means of doing so. The evidence of Mr.

[1] *Report of* 1863, Appendix, p. 530.

T. G. Baring (*Q.* 5229—5402) is conclusive on this point, and we entirely agree with the answer made by that gentleman to a question tending to prove that if the guns made at Elswick had been made at Woolwich, a saving of 242,000*l.* might have been effected. Mr. Baring replied: 'The Committee must not accept the return to which the Honourable Member is referring, as a return of any value for the purpose of such a comparison as he is instituting.' (*Q.* 5266.) The competition between the Elswick Factory and the Royal Gun Factory at Woolwich certainly contributed to this diminution of price, and had some other beneficial results; and we regret that this competition should have ceased. It must never be forgotten that the principal resource of this country in a great emergency—a resource no other country possesses to the same extent—lies in the enormous magnitude of its private yards and workshops. The Power which can produce an immense quantity of the newest and best material of war in the shortest time, will be the Power most successful in the contest. War, like other things in these days, is made by machinery; and establishments like those of Sir W. Armstrong at Elswick are not inconsiderable elements of our national force. It is, however, satisfactory to think that from the enormous demand for arms for foreign countries, these English establishments can be kept in full activity without any government patronage.

These details, however, with reference to the mode of manufacturing arms and the cost of them, are of secondary interest: the question which most deeply concerns the public is, what is the real military

value of the arms themselves? The short answer to this question is that we have got less than we expected in 1860, when the results of Sir W. Armstrong's field artillery were first known, but more than is commonly supposed now, when it is pretty well ascertained, by numerous experiments and failures, that the methods first adopted in the construction of modern guns of small dimensions cannot be satisfactorily applied to the construction of heavy ordnance, and that a different system has been introduced. Sir W. Armstrong was first extolled to the skies, and is now sometimes handled with unjust severity: but it should never be forgotten that all he ever undertook to do, has been fully accomplished; and that in the undertakings in which he has been less successful, he was urged on by others, often against his own convictions, to attempt more than he could at that time promise to complete.

When Sir W. Armstrong entered into his agreement with the Government[1] in January 1859, he only proposed and contracted to supply in the first instance field artillery. In the evidence given by Sir William, both in 1862 and in 1863, he insists more than once on this fact; and it is confirmed by the testimony of General Peel, who as Secretary for War was the other party to this contract, but who appears to disclaim the responsibility attaching to the subsequent proceedings with reference to the heavy ordnance.[2] Whatever imperfections of detail subsequent experience may have disclosed in Sir W.

[1] The text of the agreement is given in the *Ordnance Report* of 1863. Appendix, p. 486.

[2] *Evidence*, 1863: 5047, 5161, 4060.

Armstrong's field-pieces, it is impossible to deny that he has been as good as his word. Their range, their accuracy of fire, are indisputable, and enormously in advance of the old smooth-bore field-guns. They served in the last campaign in China, without giving rise to any serious objections on the part of the officers commanding the Armstrong batteries, but the contrary.[1] About 60,000 rounds have been fired from these guns in face of the enemy or in the ball exercise of the troops, and in the whole number but one serious accident seems to have taken place. The risk of accident is therefore considerably less than with the old guns. Sir W. Armstrong's ingenious projectiles have greatly increased the destructive power of his guns, and he has unquestionably made the British artillery more efficient than it ever was before.[2]

Yet the drawbacks to his system are, we believe, numerous and important. They all proceed from the fundamental mistake—as we conceive it to be—of Sir W. Armstrong, in adopting a projectile which can only be forced into or through the cylinder of the piece by loading at the breech. This very point was at first regarded as Sir William's greatest achievement, but upon a dispassionate comparison of the advantages and disadvantages of the breech-

[1] The Reports of Captain Milward, Captain Barry, and Captain Hay are printed in the *Ordnance Report* of 1862, Appendix, p. 213.

[2] One very important part of Sir William Armstrong's inventions, which has been borrowed or imitated by most of his rivals in this country, relates to the method of constructing or building up guns on the coil principle; but the remarks we are making apply simply to the military value of the gun when made, not to the process of manufacture, which will be noticed hereafter.

loading system, we are now led to form a different opinion. Sir W. Armstrong himself has now adopted the *shunt* principle for his heavy guns, which are loaded at the muzzle with ribbed projectiles, or projectiles resting on points or buttons; and we anticipate a return to the same system in our field artillery, in which very little, if anything, is gained by loading at the breech, if the projectiles are so formed that they can easily be introduced into the gun at the muzzle.[1] The form of projectile originally adopted by Sir W. Armstrong is the real cause of that 'want of simplicity' which has been urged against it by almost all the officers, whether of the army or the navy, who have given evidence before the Committees. Not being able to force his projectile by the twist of the grooves only, as is the case in most other systems, he was unavoidably led to the expedient of placing the projectile at the breech in a chamber slightly larger than the cylinder of the piece, so that in order to pass through the cylinder or bore of the gun under the pressure of the gas generated by the explosion, the soft metal with which the projectile is coated must be compressed or torn off. This method has a variety of inconvenient results. In the first place it destroys the *windage*. The absence of windage had long been supposed to be a desideratum in artillery, and it is laid down by Sir Howard Douglas, on the faith of the French experiments made at Gâvre and at L'Orient twenty-five years ago, that the windage of a gun is in direct proportion to the space between the cylinder of the

[1] This prediction has since been verified. 1870.

piece and the projectile, and that the greater the windage the less the accuracy and range of the gun, because a portion of the gas discharged is liable to escape, or to apply an irregular pressure to the ball. Recent experience, as we shall presently show, has very much modified this doctrine. Provided the space between the projectile and the gun be a perfect *annulus*, or in other words provided the axis of the shot be parallel with the axis of the gun and of the breech-chamber, the bad effects formerly attributed to windage do not result from it, and the absence of windage may be purchased too dear, as will be seen by the following considerations:

In the first place it becomes almost impossible for the inflamed powder to set fire to the fuze of the projectile: hence Sir William Armstrong has been led to invent a system of double fuzes—time and concussion fuzes they are called—which is extremely ingenious, but complicated and somewhat uncertain. This matter of fuzes is one of the most delicate things in the whole science of gunnery, and that in which there is probably the greatest room for improvement. The field-fuze, which requires to be adapted to different distances; the fuze of heavy guns used in sieges or on ships, which require to be adapted to the resistance the projectile may have to encounter when it strikes, and to the various conditions under which hollow shot are now used, give rise to innumerable practical difficulties which have not yet been completely or satisfactorily overcome by military engineers. Multitudes of ingenious devices have been proposed and tried, amongst which Sir W. Armstrong's own inventions deserve particular men-

tion; but they are all ingenious and complicated to excess; they do not provide against all the varied emergencies of war, and such instruments are too delicate for the rough hands of seamen and soldiers.

But, secondly, the result of the more recent experience of the French artillerists proves that the suppression of windage diminishes the accuracy of fire.[1] This assertion may startle some of our readers, but we hope they will have the patience to hear us out. When the projectile is driven forwards to the muzzle of the piece, by the expansion of gas generated by the explosion, the point of time at which it leaves the gun decides its direction, and the slightest variation of pressure from within or without, at that instant, causes deviation in its subsequent flight. The absence of windage is now thought by the French to increase the probability of some such accidental variation of pressure: but when a portion of the gas generated by the explosion is allowed to escape by windage, as this gas travels four or five times faster than the projectile itself, it serves as it were to prepare the atmosphere for the ball, and to launch it on the straight line of its trajectory. The whole of the modern artillery of France is constructed, with what would formerly have been termed a considerable windage, on this principle; yet in point of accuracy and regularity of fire, we believe that it is not surpassed by any artillery in

[1] Mr. Whitworth stated the same fact at the Institution of Civil Engineers, in December 1860. 'It was a mistake,' he said, 'to suppose that any serious loss arose from a small amount of windage:' and he quoted an experiment between a leaden shot with no windage and an iron shot with windage, showing that the latter had the advantage.

the world. It is an error to suppose (as is commonly the case in our treatises on the science of guns) that the suppression of windage is really a great economy of force: what may be gained in force by the close compression of the gases is lost in friction. A curious experiment recently made in France removes all doubt on this point.[1] A heavy gun of 30 French measure (corresponding to our 70-pounder), which had already fired 280 shots at iron plates 4½ inches thick, and pierced them at a distance of 1,093 yards, was treated in the following manner:—The gun was bored like a flute with thirty-six holes, each of six centimetres diameter. In this state it was again fired, and it turned out that the initial velocity of the projectile was only diminished by $\frac{1}{45}$th, or scarcely 2 per cent. But, on the other hand, the accuracy of fire of the piece was greatly augmented, and the recoil, which had averaged about seven metres before the operation, was reduced to 1 metre 40′. It is therefore now asserted by some of the highest French authorities that windage, without really diminishing the power of guns, improves their accuracy, and

[1] For this statement and for the numerous particulars relating to French rifled artillery, which will be found in this article, we are unable to quote the authority of names or of any publications. A good deal of mystery has been thrown over the whole subject abroad, and many of the facts we are about to produce are now made known for the first time. We must therefore beg the reader to take these statements from us upon trust, with the assurance that they have come to us on unimpeachable authority, and that we have taken every precaution in our power to ensure strict accuracy and to avoid the slightest exaggeration. The French weights and measures are generally given: in giving the corresponding English weights and measures we have not aimed at scientific precision. The superior convenience of the decimal system is never more apparent than in dealing with quantities and proportions of this kind.

greatly reduces the stress of the explosion on the piece. The experiment we have just related was described at the time in the French and German newspapers, and it was conducted under the direction of Colonel Treuille de Beaulieu, who had as early as 1842 submitted to the French Artillery Committee a theory of artillery founded on this principle, in direct opposition to the views then universally entertained. At that time Colonel Treuille's paper was thrown aside; but he has lived to see his system adopted as the basis of the rifled ordnance of the French empire under his own direction.

Upon this important question of windage it will be seen that the Armstrong system and the French system are diametrically opposed, and so are, we may add, the opinions of the authorities on these matters in the two countries. It was a perfectly received and established doctrine both in France and England, under the old system, that the windage of a gun should be reduced as much as possible to ensure force and accuracy. Accordingly, the windage of our smooth-bore guns was reduced from $\frac{1}{32}$th of the diameter of the bore to $\frac{1}{64}$th, and was in no case to exceed ·2 inch even for the largest guns.[1] 'In practice,' says Sir E. Tennent, 'the effect of windage in smooth-bore pieces is to force the ball against one side of the barrel, whence it rebounds against the other, making a zigzag motion in its exit, which is fatal to its steady flight.' The Armstrong system of courses reduces windage to a minimum, as the projectile is forced through the cylinder of the gun from

[1] *Aide-Mémoire*, p. 637.

the breech. But when the missile rests firmly in the barrel on projections fitting into the grooves, this zigzag motion is impossible. In all muzzle-loading guns some windage is absolutely necessary to allow the air to escape and to pass over the deposits that accumulate in the barrel, and Mr. Whitworth introduced a contrivance for that purpose.[1] *Provided the projectile leaves the gun with its axis in line with that of the piece, the inaccuracy caused by windage ceases,* and this is precisely what is obtained both in the French and in the Whitworth guns. The space existing between the projectile and the barrel then becomes of no importance. We believe this to be the true state of the case; but we are perfectly aware that the discovery of this truth is one not yet familiar to military men in this country, and we invite them to consider it, for upon this point the whole controversy really turns between the Armstrong breech-loading rifled gun and its muzzle-loading competitors.

Again, as the suppression of windage in the Armstrong gun causes the resistance and friction of the projectile against the cylinder of the gun to increase very rapidly, the piece fouls to a far greater extent—a circumstance at all times inconvenient and which may, under some circumstances, render a gun useless. In any case, the accuracy of the piece is impaired by fouling, even where the lubricator wad is used, unless it be sponged out and washed frequently. The Report of the Ordnance Committee of 1862 is explicit on this point:—

[1] Tennent, p. 188.

'The employment of water in sponging must be mentioned as an objection, which Mr. Armstrong's guns share with those rifled on other systems, but the Committee are of opinion that this objection can be met with little difficulty. Experience with the 12-pounder shows that when no water is employed ten or twelve rounds can be fired without a material decrease in accuracy from the fouling of the gun. It also appears that this decrease in accuracy is prevented by sponging with a damp sponge after every round.' (*Report*, 1862, *Appendix*, p. 167.)

The Committee took a favourable view of the matter, but to wash out a gun after every ten or twelve rounds is a condition not always of easy execution in war. So likewise, 'to sponge after every round' may be an excellent precaution, but it is not consistent with that rapidity of fire which is sometimes the first object. At the battle of Solferino, when the corps of General Benedek, having driven in the Piedmontese army for a distance of two or three miles, threatened to turn the left of the French position, it was fortunate for the French army that they had guns not requiring to be sponged out after every round; for it was the extraordinary rapidity of the fire of the rifled batteries of the French Guards which arrested the Austrian advance at a range which then appeared incredibly great, and enabled the Piedmontese to recover their ground. At the same battle the French artillery were in want of water, on some points, not for the purpose of washing the guns, but of *cooling* them, several of these guns having fired more than 300 rounds in the day; and if it had not been for the prodigious heat generated by so rapid a fire, many of them would have consumed even more

ammunition, though without the aid of water or damp sponges. On a recent occasion at Rennes the experiment has been tried on the new French artillery in a still more striking manner. A gun, taken at random from one of the batteries of the troops quartered in that town, was fired consecutively one thousand times, without being washed or sponged out, and without even once washing, clearing, or scraping the touch-hole. After this extraordinary trial, we learn from the report of the officers in command that the gun had only lost $\frac{1}{75}$th of the degree of precision required by the regulations of the French service. It is proper to add that this experiment was made with compressed gunpowder: but the result is mainly due to the windage of the piece, which is now freely admitted by the French artillerists to be not only no evil, but an essential condition of accurate and rapid firing.

Further objections might be urged arising from the form of the projectile adopted by Sir W. Armstrong, and especially from the thin leaden coating in which he encloses it, in order to force it through the grooves of the cannon. If the shot is to be perfectly accurate, this coating must be torn away or compressed in exact symmetrical proportions by each of the grooves: if, by reason of any defect in the manufacture, or of any blow, or by the fouling of the gun, the slightest irregularity occurs in the surface of the projectile it will no longer travel accurately along the bore, and as the expansion of the gas within tells naturally with the greatest force on the weakest point, a deviation will take place in the flight of the shot. It may also happen—indeed it has sometimes happened—

that the leaden jacket, peeling away too soon, flies off at the mouth of the gun to the serious injury of the troops near it. In answer to this objection, Sir W. Armstrong appealed to Captain Milward (now Colonel Milward, employed in the Royal Gun Factory at Woolwich), whose battery fired in China a considerable number of shots over the heads of the 60th Rifles, without any mischievous consequences. But we are not aware that Sir William has replied to a letter published in the 'Mechanic's Magazine,' and republished in 'The Times,' in which it was stated that some of the men of the 44th Regiment were wounded under similar circumstances, and that the fact could be proved by the positive testimony of the hospital entries.

Without dwelling further on these details, we proceed to consider that which is the special characteristic of the field artillery of Sir W. Armstrong. The principle from which he started was that of constructing a projectile, to be to all intents and purposes, on a larger scale, precisely what the bullet is to the English rifle or to the rifle of a Swiss chamois-hunter. The necessary consequence of this postulate was that the gun should load at the breech. A leaden bullet may be rammed down an Enfield musket or a Swiss rifle by a few sharp taps of the ramrod, or it may be expanded on the Minié principle by the explosion: but as no such effects can be produced upon a mass of metal as large as an iron cannon-ball, it was necessary, in order to force the passage of the projectile, that it should be inserted at the breech, assuming that it was to be somewhat larger than the cylinder of the gun. Once tied to these conditions,

Sir W. Armstrong showed great skill and ingenuity in dealing with them. Of all his inventions, none has been more criticised than the *vent-piece*, and none is more open to criticism: yet there is something extremely ingenious in throwing the main stress of his gun upon a part of it which may be easily removed and easily renewed even in action. Nor do we think Sir William wrong in placing the touch-hole of his gun in the vent-piece, although that part of the gun is still more weakened by this circumstance; but it enables him to replace the touch-hole altogether, just as a sportsman changes the nipple of a percussion fowling-piece. Yet in spite of these considerations, we hold that it would have been far wiser to dispense with the breech-loading system, instead of expending infinite skill and money in attempting to obviate its inherent defects. Nothing can be more ingenious than this mechanism, but the results obtained by it are not commensurate to the evil and the danger of entrusting ingenious mechanism to rude and incompetent hands. It is essential to preserve the confidence of soldiers in their arms, and, say what you will, a gun consisting of one piece of solid metal inspires troops with greater confidence than a gun consisting of several distinct portions, each of which is indispensable to the efficiency of the arm, and each of which must be brought to bear on every other part with mathematical precision. It is certain that the operations of loading, firing, and cleaning require greater nicety with the Armstrong gun, and are in themselves more complicated, than they were with the smooth bore. Does the Armstrong gun in reality give the men that

degree of moral and physical certainty, which its advocates have claimed for it? Who shall prevent the artilleryman from speculating on the probable duration of the vent-piece—an element, at present, of some uncertainty, as has been demonstrated by the experiments made at Shorncliffe, on the 'Trusty,' and elsewhere? But even if the manufacture of vent-pieces were so far improved as to remove all doubt on that score, the safety and duration of this important part of the gun depend on the rigorous precision with which it is inserted in the proper place, and the screw driven home. We have heard Sir W. Armstrong remark that all the accidents which have occurred with his guns have arisen from the clumsiness or stupidity of the men who handled them. No doubt this is true; but can the degree of care and nicety which such tools require be expected from soldiers and seamen in the heat of action? In loading an Enfield rifle or a muzzle-loading gun, one smart blow with the ramrod tells the loader that the ball is in its place; but the pressure of a screw is far less definite, and although the indicator ought always to be brought home, it is not safe to rely on this precaution, in the hurry of intense excitement.

The Ordnance Select Committee, after having investigated all the cases of accident which had occurred with Armstrong guns on board the 'Zebra,' 'Marlborough,' and other ships, reported that they had no occurrence of the kind which was not clearly traceable to the vent-piece not being screwed tight. It has now been admitted in the House of Commons that similar incidents occurred in the attack on the forts of Kagosima, which is the first naval engage-

ment with forts that has taken place since the introduction of the gun: one of the guns 'jammed' for half an hour; several vent-pieces gave way; and the sea being rough at the time, complaints were made of great want of precision in firing. But all this only proves how difficult it is to obtain the requisite accuracy from seamen under fire. Colonel St. George observes, in his Minute of December 10, 1862:—

> The Committee receives with increasing anxiety the reports of such occurrences. There have been few of these since the introduction of wrought iron; but it is not to be disguised that the continuance of this system of breech-loading will be endangered, if, notwithstanding every exertion to find the best material nature affords, and all proper care and skill in the use of it, such accidents prove to be of frequent occurrence. (*Appendix to Report of* 1863, p. 355.)

The Military Committee which met at Woolwich on January 8, 1863, reported in precisely the same sense we have indicated that 'the superior refinement of rifled arms will always cause them to contrast unfavourably in handiness and ability to bear rough usage with the old smooth-bore guns, and that the adoption of the breech-loading system causes much complication and necessitates a large amount of care and intelligence in its use.'[1]

These are the leading criticisms which have been made on Sir W. Armstrong's field-guns, by men of great experience and knowledge. But whatever force or truth they contain, it is not the less certain that Sir W. Armstrong has redeemed his pledge with

[1] *Report*, Appendix, p. 336.

the Government, and that he has produced a field-gun which combines the range and accuracy of rifled ordnance throwing elongated projectiles, with a certain fitness for war. We by no means apply to his inventions the extravagant language of panegyric in which they were at first recommended to the public: but we highly appreciate the qualities undoubtedly possessed by these guns, and we have read with extreme satisfaction, in these Parliamentary Reports, the temperate, dignified, and sensible language in which Sir W. Armstrong stated his case to the House of Commons Select Committee. On one point only, we think, to borrow a metaphor from his own inventions, that he overshot the mark.

At the conclusion of one of the long statements in which Sir William answered some of the objections made to his guns, he exclaimed, 'I think the country has gained a system of guns and ammunition, which taken in combination is at present unrivalled. If a a rival there be, I at least do not know where it is to be found.'[1] These expressions are very emphatic, but we must add questionable. It is by no means admitted that the Armstrong gun is 'unrivalled' even in the field of British experience and invention: and this speech implies a singular ignorance on the part of Sir William Armstrong of what has really been done by other countries. To speak, for example, of the guns which have now been introduced for five years into the French service—a Power inferior certainly to none in all that relates to the art of war: those guns were used in the Italian campaign of

[1] *Report of* 1863, *Q.* 3265.

1859, in the Chinese campaign of 1860, more recently they have been used in Cochin China[1] and in Mexico—they have been opposed to the celebrated artillery of Austria, which they instantly silenced, on the bloody field of Solferino; they have spread terror among the barbarous tribes of Northern Africa and Eastern Asia; they have crossed the Mexican cordillera in a country without roads; they have discharged no less than half a million of shots in almost every latitude of the globe—trials far exceeding those to which the Armstrong field-guns have yet been exposed. Sir William himself states that in China about 4,000 rounds were fired, and to this something must now be added for the recent operations in New Zealand. These are the only opportunities we have had of trying the English gun in actual warfare. The French system of rifled ordnance has been adopted without modification by the armies of Spain and of Italy: it has been more or less closely imitated by Austria, by Russia, by Holland, and we believe by Sweden and Denmark. It has, therefore, obtained the confidence and approval of the military authorities in all these countries. Prussia and England have each distinct systems of their own. The operations in Sleswig (and subsequently in Bohemia) did not suffice to demonstrate the power and durability

[1] M. Pallu, in his *Narrative of the Expedition to Cochin China in* 1861 (p. 72), gives an interesting account of the artillery brought up against the works of the Annamites on the 24th of February of that year. The guns consisted of 6 mountain guns, 3 rifled *fours*, 4 rifled *twelves*, whilst 5 of the naval rifled *thirties* (equal to our 70-pounder), were brought to bear on the enemy. Apart from the military interest of this operation, we are utterly unable to discover from M. Pallu's book the object of all this destruction and carnage.

of the Prussian gun; but, although we flatter ourselves that the Armstrong gun will hold its position, it is absurd to claim for it an undisputed pre-eminence over the guns and projectiles of a multitude of other states, with which the Ordnance Committees and the inventors of this country are most imperfectly acquainted, as is evident from their remarks on the subject.[1] We are the only people on the face of the globe who publish our experiments in gunnery in the newspapers. The real efficiency of the guns of other Powers will only be known when they are engaged in war; but although it is very interesting to us to know what are the guns we have to use, it is of still greater importance to ascertain the strength of the guns which may be used against us. It is of course difficult to penetrate the mystery in which the French Government has shrouded its proceedings in artillery, but we are in possession of some evidence on the subject. Moreover, complete drawings of the French field-guns have been communicated to the Spanish and Italian Governments; the guns themselves were seen in action by our officers in China; and one of them was captured by the Austrians a

[1] Captain Blakely appears to know more about the French gun tha any other witness examined before the Committee, and his evidenc (1863, *Q.* 4860–66) is instructive. Being asked whether he thought th Armstrong gun would have the same effect on the armament of 'L Gloire' as a French gun would have, he answers, 'I think not.—*Q.* Yo think then the French gun is superior to the Armstrong gun? *A. I a sure of it.*' It will be seen further on, however, that the 'Gloire' is not ye armed with the gun he was describing, but with hooped 30 kilo. gun Captain Blakely, however, fell into an error in stating that this gun i *not* a steel gun, but that 'two-thirds of the weight of it is cast iron, t which steel rings are applied.' The truth is that the whole gun i question was of cast steel, afterwards hammered, with steel hoops adde to it.

Magenta. The system is, therefore, pretty well known, and we are the more astonished that so little authentic information on the subject appears to have come to the knowledge of Sir W. Armstrong and the Ordnance Committees.[1]

The French gun is constructed upon principles widely different from those which have been adopted in the rifled ordnance of this country, and the invention has been arrived at in a very different manner. It is a remarkable fact, that with the exception of Captain Blakely, late of the Royal Artillery, Captain Scott, R.N., and of Colonel Eardley Wilmot, all the persons who have been most actively engaged in the production of British rifled artillery are civilians, as Sir W. Armstrong, Mr. Whitworth, Mr. Lynal Thomas, &c. In France, the problem has been exclusively treated by military men—Colonels Treuille de Beaulieu, Tamisier, Chonal, Pelissier, Minié, Burnier, Didion, Dumaretz, Frébault, Lafaye, Hudelist, Dart, Lafon, Lepage, Gras, Goberd, Touche, &c.,—and the Emperor Napoleon himself, who studied the arm under a very competent master, the Swiss General Dufour. The French Comité d'Artillerie is a body

[1] It is, however, proper to state that in 1863 Sir W. Armstrong gave the Ordnance Committee of the House of Commons his own account of the French Guns (*Q.* 3228) in a very depreciatory tone, and, as we believe, in inaccurate terms. For example, in speaking of the French hooped guns he omitted to specify that they were cast-iron guns *hooped with steel.* We are informed on good authority that none of the French iron guns hooped with steel have burst, except when intentionally charged to excess, whereas none of the iron guns hooped at Woolwich have succeeded. Perhaps it is not unnatural that the inventor and maker of an entirely new *matériel* of war should entertain a less favourable opinion of a system by which the whole of the old *matériel* of the French army and navy has been rifled and rendered available for efficient service.

of general officers, who have more or less served in the wars of the last half century: it is especially charged with the study of these questions: all inventions in gunnery are brought before it, and the object of its inquiries is to select what is best in each and to arrive at the most useful practical result, with a view to the various and complex duties to be performed by artillery in war. In this country, the Select Ordnance Committee of the War Department is far from having the authority which attaches to the Comité d'Artillerie in France; although, as the head of the War Department in England is himself generally a civilian, it would seem especially necessary that he should be supported by a powerful body of professional advisers. We must say, from the evidence and minutes before us, that the professional Ordnance Committee appears to have contributed nothing whatever to the progress of the science, and to have confined its operations, to giving a ready assent to the propositions of Sir W. Armstrong (who indeed was at one time a member of the Board), and a very scant hearing to everybody else.

The fundamental principle on which, according to Sir William Armstrong's own statement, his system of artillery rests, is precisely that which was most likely to occur to the mind of a distinguished worker in metals. It struck him that with the admirable tools we now possess, and the aid of the steam hammer, it would not be a difficult task to forge a rifle of such dimensions that the gun would be a cannon. Or as he himself expresses it,

In the month of December last (1854) my friend Mr Rendel, the well-known engineer, submitted to Sir James

Graham a communication he had received from me, suggesting the expediency of enlarging the ordinary rifle to the standard of a field-gun, and using elongated projectiles of lead instead of balls of cast iron. (*Report of* 1862, *Appendix*, p. 158.)

These expressions give us the true term of comparison between the two systems. Sir W. Armstrong was solely bent on applying his great mechanical ingenuity to the construction of an enlarged rifle; he arrived at no more. The rifled artillery of the French army is, on the contrary, the result of the systematic labours of a body of officers profoundly versed in those branches of exact science which concern their profession, familiar with the traditions of the service, well acquainted with the resources of the forge in the arsenal and in the field, and able to judge of what may be expected on a field of battle from the horses and the men by whom these guns are to be worked. This mode of proceeding had very nearly the effect of absorbing and extinguishing the merited celebrity of the real author of these inventions[1]—we may almost

[1] The Emperor Napoleon, who has paid great attention to artillery, and has himself invented a gun to which his followers would readily have ascribed all the honours of the new system, had the good taste to disclaim these compliments and to ascribe the merit where it was justly due. The day after the battle of Solferino, when the Army was still amazed by the performance of the Artillery in that action, the Emperor, instead of accepting the phrase 'canon de l'Empereur' which was beginning to circulate, sent the following note to the 'Moniteur,' written, it is said, by his own hand. It was published in the official part of the paper on August 5, 1859. We quote the original. 'L'Empereur, qui ne laisse jamais sans récompense un service rendu, vient de nommer colonel d'artillerie, M. le Lieutenant-colonel Treuille de Beaulieu, directeur de l'atelier de précision, pour la part capitale qu'il a prise à la création du nouveau système de canons rayés, qui, dès l'année 1842, avait été déjà de sa part l'objet d'études sérieuses et d'ingénieuses théories que l'expérience a pleinement confirmées.' The other person to whom France is most indebted in this matter is General Ducos, Count de la Hitte, late Presi-

call them discoveries—in the general reputation of the corps to which he belongs; but, on the other hand, the French have produced a more methodical system, and one better adapted to all the exigencies of the service than could have been obtained from any single individual, especially if that individual was not a military man, but an accomplished engineer putting forward no claims to scientific military education or experience in the field.

The most salient characteristics of the course taken by this Board of French officers is their adherence to simplicity, their horror of complexity, and their preference for what is most practical and economical. In war, as in other things, economy is power; though that is a proposition seldom borne in mind in framing the naval and military estimates of this country. Whether the French gun be as good as the English gun, or not, the French army has unquestionably been provided with highly efficient rifled artillery at a price not to be compared with what has been paid for ours. Let us now follow the proceedings of the French Board. It was first established by long discussion and experiment that the peculiar advantages of rifled ordnance, namely *range* and *precision*, could be obtained without impairing the strength of the gun or the facility of working it.

dent of the Comité d'Artillerie. Colonel Treuille de Beaulieu himself spoke of this distinguished officer, in his section of the Report of the London International Exhibition of 1862, in the following terms: 'It would be unjust to omit on this occasion the name of General La Hitte, who at once took upon himself the responsibility of the new principles, and has continued with the utmost ability to carry them into execution. It is mainly to his firm adherence to these principles, and to the general uniformity of system he established, that the success of the new arm is to be attributed.'

Starting, therefore, from these two points, they decided that as to *precision*, it was more important to obtain longitudinal precision and uniformity of fire, than to prevent lateral deviations, because in modern warfare the object fired at is almost always broad, but seldom deep: as to *range*, they saw no advantage in endeavouring to carry it to the maximum of distance, but they systematically and deliberately reduced it to the limits likely to be of use in action, and to the power of the visual organs of man under the most favourable atmospheric conditions. So likewise, in considering what is actually required of field artillery, these officers did not lay great stress on what may be termed the absolute force of the gun, represented by a high initial velocity and great power of penetration. What they were in search of was a gun well adapted to the exigencies of the service; and they held that any ulterior qualities which might be obtained, beyond what was really needed, would be obtained at a waste of labour and money, and might involve the loss of other advantages. A field-gun can never be too simple, or too light, or too easily handled; and as it is only intended to act against men or horses, or at most light field-works, it would seem that provided it carries a projectile of a destructive character with accuracy to the required distance, it has force enough to accomplish its purpose. In other words, it is not worth while to increase the weight or complexity of the gun, with a view to give it other qualities, not often, if ever, required for field purposes.

At the time when these subjects were discussed in France, the whole field artillery of the army con-

sisted of smooth-bore guns of the same calibre, namely *twelves*—a description of cannon invented by the Emperor Napoleon, for the purpose of firing indifferently round shot, shells, and canister.[1] But when it was decided to introduce a system of rifled artillery, based essentially on the principle of lightness and simplicity of construction, the first step was to reduce the calibre of the field-guns of the whole army to *fours*, which was held to be sufficient.[2] Indeed, a still smaller calibre would perhaps have been adopted if the guns had been intended to fire solid shot; but as it had been determined to use nothing but hollow shot and canister, a greater diameter was requisite to allow room for the bursting charge of each projectile. The old *twelves* are still retained in French field service and have been rifled, but they are attached to each corps in very small numbers, being regarded as guns in reserve for certain unforeseen contingencies. The true French

[1] This gun which performed the whole service of the Crimean war, was known in the French Army as the 'canon de l'Empereur,' which it really was. When Marshal St. Arnaud addressed to the Emperor his first report after the battle of the Alma, he began with the emphatic words 'Le canon de votre Majesté a parlé'—a phrase intended no doubt to convey a compliment to the Imperial inventor, as well as a political signification.

[2] The old mode of describing guns by the weight in pounds of the round solid shot they would throw is, of course, fallacious since the adoption of elongated projectiles. What was formerly meant by *fours* was that the gun would throw a spherical solid shot weighing *four pounds*; but as the solid conical French shot weighs about twice as much as a round shot, the actual weight discharged would be in modern French weights *four kilogrammes*, or 8·823 pounds. Throughout this article, whenever a French gun is designated by a number, that number means *the weight in kilogrammes* of the projectile: if expressed in English pounds the number must be rather more than doubled, one kilogramme being equal to 2·206 lbs.

field-gun is now what we have designated as *fours*, because the internal diameter of the gun is that of the 4-pounder. It throws a bolt of 4 kilogrammes or 8·823 lbs. The diameter of this gun is in French measurement 86·5 millimetres, or rather more than the diameter of Sir W. Armstrong's 12-pounder of 3-inch bore, since 3 English inches are equal to 76 millimetres. The gun alone weighs 333 kilos. or about 6 cwt. and three-quarters. The whole piece on its carriage and wheels, with fourgon and 34 rounds of ammunition, weighs only 1,200 kilos. or 24 cwt. The charge of powder invariably used is one of 550 grammes (1 pound 3 ounces). This charge will throw a projectile at the greatest elevation of the gun, 4,600 metres or 5,000 yards, but this range is considered excessive, for in their extreme desire to simplify their implements of war, the French have only sighted their field-guns for a range of 3,200 metres or 3,500 yards, which they appear to regard as the utmost range of practical firing. The projectile usually employed is a shell which, when loaded, weighs 4 kilos.: this shell is barely twice the length of its diameter, but the diameter of the French gun is larger than that of the English gun in relation to the charge of powder and weight of the projectile This difference has important consequences, as we shall presently show.

In France, as well as in England, it may now be said that rifled field-guns fire nothing but hollow projectiles—shells, shrapnell shells, or the canister shot which has superseded grape. The French 4-gun throws a common shell charged with 200 grammes (7 ounces) of powder, which suffices to

burst the projectile into 20 or 25 *dangerous* fragments, for the French do not reckon the total number of fragments thrown off, but only those of a certain weight, and which are found to have a destructive force of penetration in the receptacle where they are tried. It also throws a shrapnell shell (*obus à balle*) loaded with 60 grammes of powder (2¼ ounces), which likewise bursts into 20 or 25 pieces, and carries 85 leaden bullets, impelled with destructive force by the velocity of the shot to about 300 yards beyond the point where the shell bursts. The 9-pounder diaphragm shell in our service, with a diameter of 4 inches and a charge not exceeding one ounce, carried only 52 bullets, and was required to burst about 50 yards short of the object to be hit.[1] By these charges the effect of the French shell is prodigiously augmented, and it covers a wider extent of ground than the segment shell of Sir W. Armstrong. Nothing can be more ingenious than the structure of that formidable missile, but its destructive effects are confined to the detached segments of the shell itself, and the charge of the 12 lb. segment shell is one ounce of powder only. Lastly, the French field-gun throws a canister shot which is a mere case of zinc, bursting at the muzzle of the gun, and throwing 41 iron balls contained in it to a distance of about 700 yards.

This is the cannon, these are the missiles, which decided the sanguinary campaign of Italy in 1859. Their tremendous power was demonstrated at the first outset on the fields of Magenta and Solferino, where the Austrians lost 40,000 men; and it is well

[1] Aide-mémoire, vol. iii. p. 395.

known that the Emperor of Austria, deeply afflicted as he was by a reverse he had not anticipated, attributed his defeat chiefly to the incontestable superiority of the French artillery. The splendid batteries of the Austrian army were mowed down before they could even get within range of the enemy, and a few minutes sufficed to annihilate the horses and render the guns useless. Yet, strange to say, in the month of April 1859, when the campaign opened, neither Europe, nor France, nor even the French artillery, knew that there was such a thing as rifled ordnance ready to take the field. Very few of the officers or men had even heard anything of the guns they were about to use. They started with empty carriages—no guns at all upon them; and the guns were sent after them from Paris (where they had been rifled) in oblong cases marked *fragile*. On the arrival of these cases at Genoa, the guns were mounted. This anecdote was related at the time by the correspondent of an English newspaper; we have since heard it confirmed by French officers of authority. This was certainly one of the boldest experiments ever tried in war, but it was entirely successful from the extreme simplicity of the French gun and the facility with which it is handled.

The next appearance of the French guns was in China, where, owing chiefly to the superior lightness of their carriages, they were worked with facility with the wretched ponies procured in the country, when, as appears from Captain Hay's report, our Armstrong waggons were sunk in a marsh, and ultimately sent back to Peh-tang, though the guns were got through the marsh and carried along, with

30 rounds on the limbers. It is, however, fair to observe that the Armstrong gun chiefly used by the British Artillery is a 12-pound gun, whilst the French gun more nearly corresponds in weight to our 9-pounder gun used by the Royal Horse Artillery.

Those of our military readers who have had the good fortune to witness the great manœuvres of the French army at the camp of Châlons cannot fail to have observed the effect which the extreme lightness and handiness of the new guns have had on the tactics and formation of the troops. Acting with cavalry, these guns have all the rapidity of movement of our horse artillery. Cavalry movements are still, however, but little modified to suit the changes in modern warfare. But in the infantry movements of the French army, the guns now take a most active part, and the union of the two arms is complete. Not only between the lines of divisions and brigades, but between the files of companies, and amongst the skirmishing parties in front, the new artillery wheels and fires with an ease and effect which must be seen to be believed: and we doubt not that these novel dispositions of guns will, in the first great war, modify the whole order of battle. At the affair of Montebello, the very first engagement of the Italian campaign of 1859, the action began in the lower gorges of the hills, enclosed spaces where the artillery could scarcely be brought into play. A lieutenant commanding a section of a battery (two guns) perceived a knoll which overlooked the Austrian position, but this hillock was planted with vines from top to bottom, and therefore inaccessible to horses and wheels. Tempted by the

nature of the site, this lieutenant resolved to dismount his gun and carry it boldly up the hill: the thing was done in twenty minutes and contributed not a little to decide the engagement. Probably this officer and his men had never fired a rifled gun before in their lives—and the circumstance not only reflects credit on them, but proves how admirably the gun is adapted to the various exigencies of war. On another occasion in the same campaign, a field-gun was dismounted by order of General Trochu and carried through a dwelling-house on to the flat roof, where it opened fire with great effect.

Some of the witnesses before the Ordnance Committees have expressed doubts as to the durability and safety of these French guns. We believe that they are misinformed. More than half a million of rounds have been fired from these guns without an accident arising from any defect in the gun. Indeed, as these field-guns are all of brass, not of iron, there is reason to believe that if they had not been rifled, they would not have lasted so long. The identical guns which served in Italy in 1859 are still in use, and would be again employed in active service with the regiments to which they belong. None of them have been returned to the arsenal for repairs, as whatever was needed could be done, and has been done, by the field-armourer. It has been said by a person of great authority on these subjects that, in truth, a gun was of little value in war which could not always be repaired at a field-forge, under the first hedge: and no doubt he is the best workman who can mend his own tools. It is supposed that the French gun will lose something of its pre-

cision after having fired 1,200 or 1,500 rounds; but when this occurs, all that is needed is to recast the gun—an operation of no great difficulty or expense with brass guns. Iron guns once worn out are of course useless. Thus instead of the enormous and costly establishments required in this country for the manufacture of rifled ordnance, the French have obtained all the results just described, without the slightest addition to their arsenals, except the introduction of a simple machine for rifling: but such is the accuracy and certainty of their operations, that it is now considered superfluous to prove the guns they make, after it has been ascertained by trial that the gun metal has the requisite degree of tenacity. We are assured that for centuries, no such thing has been heard of as the bursting of a French brass gun. The modern manufacture of iron guns at Woolwich presents, it must be acknowledged, in these Reports, a very different picture. Mr. Anderson furnished the Committees of 1863 with a return showing the number of Armstrong guns passed by Colonel Tulloch while he was inspector of artillery, and likewise of the guns rejected by him, and of those rejected but afterwards passed. The whole number is 169 guns, but of these it appears that no less than 40 were rejected after first proof, though afterwards repaired and passed for service.

Almost all we have said of the French light field gun is equally applicable to the gun of *reserve*, which is simply the Emperor's 12-gun rifled, and in other respects unchanged. Such was the economy of this process that the expense of the rifling was paid for by the value of the brass shavings extracted from the

grooves. The bore of this gun is 121·3 millimetres, a little larger than the bore of Sir W. Armstrong's 40-pounder, which is $4\frac{3}{4}$ in., or 121 millimetres only. Faithful to their economical doctrines, the French artillerists have not attempted to give this gun a greater range than that of the *fours*. The range is precisely the same for the two guns. This cannon weighs 610 kilos., or rather more than 12 cwt., which is about the weight of Sir W. Armstrong's 20-pounder sea-service gun. In the Crimea, before these guns were rifled, as smooth-bore guns firing spherical shot, the regular charge of powder for solid shot was 1 kilo. 400 grammes, or about 3 lbs. of powder: but since the rifling the charge has been reduced to 1 kilo., a force found to be sufficient for all that is required. The weight of the projectile has on the contrary been doubled. The common shell, loaded with 600 grammes of powder (or 21 ounces English), weighs 11 kilogrammes and a half, or rather more than Sir W. Armstrong's 25-pound shot. The *obus à balle* contains 200 bullets: the canister, 41 iron balls, but larger than those used for the smaller gun, and ranging further. The entire gun mounted, with its regular ammunition, weighs 1,800 kilos. or 36 cwt.: it is drawn by six horses, and served by nine men as before.

Some batteries of the Emperor's 12-guns *rifled* were attached to the army of Italy in 1859, but without firing a single round. The declaration of war took place before the preparations of the French were complete, and there was a deficiency of projectiles,[1]

[1] Although the effect of the French rifled ordnance at Magenta and Solferino was considerable, it would be much more effectual now. At that time the want of the new projectiles was such, that the troops were obliged to use whatever missiles could be got, many of imperfect construc-

especially for the rifled twelves. Hence it was necessary to economise ammunition, and the stores of the artillery of reserve were economised altogether. It is not impossible that this scarcity of effective ammunition may have contributed to the early termination of the war: however, the rifled 12-gun has since been actively employed in Mexico, especially at the siege of Puebla; where it rendered most important services against the massive blocks of houses of that town. This gun proved highly effectual as a battering-gun on that occasion, and its utility was greatly increased by its lightness and economy. If it had been necessary to bring up a battering train of the old 24-pounder siege guns from Vera Cruz, across the *terra caliente* to the table-land of Mexico, the thing would either not have been done at all, or done at an immense cost of labour, life, and money; for, even as it was, the operations were at one time suspended for want of powder. Fortunately for the French they had a siege gun which combined great efficiency with facility of transport and low charges.

To conclude what we have to say on the subject of light or field artillery, we should like to be able to compare our own diagrams of gun practice with what the French term their 'rectangles des tirs:' but the materials for such a comparison are not before us, and the elements from which the calculations are made in the two countries are so dissimilar, that it

tion. The fusee adopted at that time proved unsatisfactory, and has since been improved. The batteries of the artillery of the Guard were alone supplied with their full complement of the new ammunition in 1859. All the defective stores have now been used up in garrison practice, and the arsenals are well supplied with projectiles of the best workmanship.

would not be fair to found any relative conclusions upon them. Abundant information as to the British experiments is indeed to be found in the Appendix to the Ordnance Reports, stated with the precision of scientific analysis. The French endeavour, on the contrary, to assimilate their experimental operations as much as possible to the operations of a battle. Take for instance the following theorem, which we borrow from the instructions lithographed for the use of the French military schools.[1]

Let a structure in deal boards be so arranged as to represent a battalion formed in close column, or in column at half-distance. Two batteries of the French *twelves* (25-pounders), complete, are started against this imaginary battalion from a distance of two or three miles, across a country of which the artillery has no previous knowledge. The order given to the commanding officer is to advance constantly on the battalion at a trot, as if he were about to charge it, and only to stop upon a signal made to him at various distances not preconcerted. The guns are then to open a rapid fire, which lasts until the general directing the movement signals a further advance. Suppose that these batteries have started at 4,000 metres (more than two miles and a half) from the battalion, the following table gives the result obtained. Of course the projectiles used are not loaded shells.

[1] We understand that a similar experiment has been tried at Aldershott, but there is great difficulty in finding, in the neighbourhood of London or Woolwich, a spot where such an exercise can be conducted with safety.

Distances	Rounds fired	Shots that struck the battalion
2,700	48	22
2,000	120	80
1,950	84	42
1,900	42	28
1,550	120	81
1,250	54	35
	358	288

or about 80 per cent. effective shots in this exercise intended, as far as possible, to imitate actual warfare. The French artillery are justly proud of this result, and we are assured that the figures we have given represent the average practice of the 12-gun batteries of the French army. We have no analogous statement of practice in our own army, but we are inclined to believe, from the particulars which have reached us, that, in point of lateral deviation, the two systems are nearly alike, but with some advantage to the English gun: in point of longitudinal accuracy and uniformity of range it may be with the French. This accuracy was at once apparent in the campaign of Italy, in so much that the infantry almost immediately learnt to take its distances from the artillery —given the angle of elevation and the point of incidence, the guns became a perfect stadiometer for all practical purposes. To show the extraordinary precision of the instrument, we may add a circumstance that has recently come to our knowledge. The French gunners in Mexico found to their great surprise that their guns were not sighted correctly, and that the practice was different from what it had been in France. The difference arose from the diminished pressure of the pure and rarefied atmo-

sphere of the Mexican *plateau* as compared with that of the polygon at Vincennes. So that the gun became, in some degree, a barometer for measuring altitudes.

Before passing to the subject of heavy artillery, it may not be amiss to put the reader on his guard against the erroneous impression sometimes produced by stating an enormous weight of projectile, as if it were the true expression of the power of a gun. When all guns threw spherical cast-iron shot, the weight of the ball served to denote the calibre of the piece—that is to say, the diameter of the internal cylinder, which, in the then state of the science, determined almost all the conditions of the gun; for, the calibre being known, the charge of powder, the initial velocity, the penetration, &c. followed as a matter of course, by certain rules, all fixed by the weight of the ball. But with rifled artillery and ogivo-cylindrical projectiles, the case is altered; for these projectiles may be extended in length to almost any amount, and the consequence is that the weight of the projectile is no longer any test of the power of the gun, nor does it even express approximatively the dimension of the bore. The French, as we have previously remarked, have retained the designation formerly applied by them to cannons throwing spherical shot (reckoning kilogrammes for pounds), and they avoid giving to their projectiles more than twice the length of their diameter; the length of the Armstrong shell is 2·25 diameters. In every instance the French gun with an equal bore throws a lighter shot, because the English projectiles are generally longer than the French. This distinction is more

strongly marked in Mr. Whitworth's guns, because he fires projectiles still more elongated; and still more apparent in the American guns, which surpass all others—at least in the length of their shot. The nominal weight of the projectile is therefore no longer a correct indication of the size of the gun.

In order to illustrate these differences, we have endeavoured to bring within the limits of the following Table a comparison of the rifled guns now existing in the services of the two countries, as far as it can be made.

Thus, setting apart on each side the light mountain-gun, the British army has two classes of field artillery—ten batteries of 9-pounders (R. H. A.) and twenty-four batteries of 12-pounders. The French rely on the 4-kilo. field gun as their principal weapon. As compared with our 9-pounder, it weighs 70 lbs. more; the charge is rather larger in the French gun; the weight of the projectile rather less; but the bore is no less than ten millimetres larger in the French gun than in the Armstrong. If the French 4-gun be compared with our 12-pounder, it is nearly 200 lbs. lighter, the English charge is one-fifth larger, the English projectile is one-fourth heavier, but the French bore is still ten millimetres larger than the weightier British gun. So again in the Armstrong 20-pounder and the Armstrong 40-pounder, which come nearest to the French 12-kilo. and 24-kilo. guns respectively, the French charges are lower, but the relative bore of the French gun is considerably greater. This is a point to which the French artillerists attach the greatest importance, and to which they attribute

Armstrong Guns in the English Service							Rifled Guns in the French Service				
Gun	Weight	Charge		Diameter of bore in E. inches and millimetres			Gun	Weight	Charge	Weight of projectile in English pounds	Diameter of bore in millimetres and E. inch
pounder	cwt.	lbs.	oz.	in.		millim.	kilogram.	kilogram.	grammes	lbs.	millim. in.
6	3	0	12	2·5	=	64	4 mountn.	100 (brass)	550 (19 oz.)	8·82	86·5 = 3·41
9	6	0	18	3	=	76	4 field	333 (brass)	550 (19 oz.)	8·82	86·5 = 3·41
12	8	0	24	3	=	76					
20	{16 long / 12 short}	2	8	3·75	=	95	12 reserve	610 (brass)	1,000 (2 lb. 3 oz.)	25·35	121·3 = 4·80
40	35	5	0	4·75	=	121	24	2,000 (2 tons)	2,500 (5 lb. 2 oz.)	52·8	152·5 = 6
70	61	10	0	6·4	=	162					
110 light	77	10	0	7	=	178	30	{	3,500 up to 7,500	68 hollow 99 solid	} 164·7 = 6·51
110 heavy	81	12	0	7	=	178	50	2,000 (2 tons)	2,500	113 (charged with 7·72 lbs. of powder)	194 = 7·81

much of their success, because it enables them to augment the bursting charges of the projectile, and the strength of the hollow projectile itself. These results are considered in France of even higher moment than the velocity of the shot discharged.

This is one of the points on which there is a radical difference between the opinions prevalent in the two services. In England we avoid loading shells heavily to prevent the too great dispersion of the fragments. The French hold, on the contrary, that it is desirable to give the maximum of explosive force to the projectile itself, and this not only by increasing the charge of powder, but by increasing the thickness and power of resistance of the shell. The destructive effect of the projectile is said to be represented by the relation between its weight and the weight of the powder contained in it. Sir William Armstrong clearly discerned the advantage of large diameters and heavy bursting charges when he said at the Institution of Civil Engineers: 'With the exception of iron-plated ships and granite batteries, there is nothing which cannot be more effectually attacked by shell than by shot. But the power of a shell depends upon the magnitude of its bursting charge, and a large bursting charge involves a large diameter.' On this principle the French have constructed their whole rifled artillery, and to a much greater extent than Sir William Armstrong. We have seen that the French use in their smallest field-guns a common shell, charged with seven ounces of powder, or else a shrapnell shell charged with $2\frac{1}{2}$ ounces: these indeed are their chief projectiles. The Armstrong field gun fires either solid shot, or

the segment shell with a low charge of powder; but no common shell with a high bursting-charge is used by any Armstrong gun below a 20-pounder. Hence it appears that our field artillery is entirely deficient in that class of shells, with high bursting-charges, on which the French place the greatest reliance. It is for this purpose that they give so large a bore even to their smallest guns: the inferior diameter of the Armstrong gun renders it impossible to use the same bursting-charges as the French, and consequently to give equal power to our common shells.

We now proceed to consider rifled guns of a heavier description. What, in the first place, is heavy ordnance? A negative definition might be given by saying that heavy ordnance comprises those guns which, on account of their weight, cannot be manœuvred in action; but it is more correct to state that we understand by heavy ordnance guns which are only used in besieging or defending fortified works, for coast defence, or on board ship. In these terms the problem becomes more clear; but when the various purposes of heavy ordnance are defined, they at once imply that the guns used for these purposes respectively ought to have very different qualifications. Thus a siege gun does not require that extreme range, nor that extraordinary power of penetration which is frequently regarded as the great test of artillery practice. It is never the interest of the besieger to break ground at a great distance from the place besieged, but, on the contrary, to get as near to it as possible, since he has to make good the whole of the intervening ground by covered approaches. Again, as the obstacle to be breached

by the fire of his guns generally consists of stone, brickwork, or earth, a very high initial velocity is not the first object to be attained by his projectiles. The destructive effect of these projectiles, all of which we assume to be hollow shot, will be determined by the amount of the bursting-charge of powder with which they are loaded, and which they introduce within the walls where they are to explode with the force of a mine. This consideration is of far higher importance in siege guns than their mere power of penetration. It is also of extreme importance that a siege train should be capable of transport without much difficulty over a difficult country. It was easy enough to send our heavy breaching guns to Balaclava; the difficulty lay between Balaclava and Sebastopol, and at length a railroad was constructed to bring up the *matériel* of the siege. Guns, on the contrary, intended for the defence of works, are stationary, and may therefore be of any weight, and they ought to be of the largest calibre to destroy the works of the enemy, to silence his batteries by heavier fire, and to throw masses of canister and grape in the event of an assault or surprise. Guns intended for coast defences require the greatest possible range, for the best service they can render is to keep off the enemy as far as possible from the shore. It should be borne in mind that in most cases, guns mounted for coast defence will be outnumbered by a powerful enemy, who can concentrate his marine artillery on any given point. The heavy land gun has more room, more facility of manœuvre, more steadiness of platform, more certainty of aim, and, except when opposed to iron-clad

ships, more safety from attack, than can be obtained at sea; but, on the other hand, the ships have the advantage of numbers, and, seen at a distance, they are small objects, moving at a rate of eight or ten yards a second, and therefore very difficult to hit. This was shown at Odessa and still more at Sweaborg, where the English and French gunboats burnt the arsenals, but being themselves kept all the time in gentle motion they suffered no damage, though they were mere wooden vessels. A coast gun ought therefore to carry as far as possible, in order to extend the zone of protection from the shore, and to have the greatest precision of fire to counterbalance the superior advantage ships have in firing at a stationary object.

In marine artillery, if it had not been for the invention of iron-plating, we should probably ere long have witnessed a diminution in the heavy armament of line-of-battle ships and frigates; and for this reason: guns of a lighter description, rifled, and throwing hollow projectiles loaded with large bursting charges, would be found to be far more destructive to wooden ships, than the old 32-pounders and 68-pounders with their solid shot. The broadside of a man of war would no longer be reckoned by the weight of metal to be thrown from its guns, but by the number of these destructive and incendiary shells, almost without reference to their size and weight. In engagements with land forts guns of heavy metal would, of course, retain their advantage; but at sea, ships fighting ships, it is probable that 5 or 6-inch shells would pierce or destroy wooden vessels with as much activity as the heaviest shot that could be fired.

Hence the number of guns might be augmented, and they would be handled with greater ease and rapidity; or the number of men serving the guns might be diminished, which is an advantage in another form. These considerations may still be of some value if applied to vessels serving in the remoter parts of the globe, unvisited by iron-clad ships of war: but very different qualifications are needed in the artillery of vessels navigating the seas of Europe, and exposed to encounter the most formidable squadrons ever borne by the waves. Iron plates of adequate thickness and good quality are the most effectual defence invented by man, for no sooner were they introduced, than they paralysed the whole artillery of the world, and defied all the projectiles, shot or shell, then in use among the most warlike nations. Four or five years ago, iron plates of 4½ inches' thickness were still impenetrable to attack. This is no longer the case. A fierce contest has sprung up between the art of attack and the art of defence, with alternate and almost equal advantage to the one and to the other. The result is still unattained; though we have very little doubt that whatever may be the strength of those iron castles, our modern men of war, somebody will at last invent a gun capable of destroying them. The 4½-inch plates have already been pierced—whereupon Mr. Reed promises us 6-inch plates for his 'Pallas' and his 'Bellerophon:' and we have even heard of proposals seriously entertained for carrying the plates to a greater thickness. But the truth is that, although the plates of 4½-inch on the targets have been pierced both in England and in France, it has been by guns of an exceptional

character, resembling scientific engines more than military weapons, incapable of rapid firing and unfitted to the general exigencies of naval warfare. The effect of the introduction of such guns into the navy is, of course, enormously to reduce the number of them. Thus the 'Royal Sovereign,' a 121-gun ship, will only carry six 300-pounders, and even then will hardly be a sea-going vessel. At this moment the possibility of penetrating iron plates appears to us to have attracted a greater degree of attention than it really deserves, as a test of the general efficiency of guns, if other considerations are sacrificed to this object. For practical purposes in war, and especially in naval warfare, we believe the enormous weights which are now under trial at Shoeburyness and elsewhere to be of very little value. They take us back four centuries to the first discharge of Mons Meg, loaded 'with a peck of powder and a granite ball as heavy as a Galloway cow.'

The experiments in artillery tried by the Americans in the course of the present war, and especially at the siege of Charleston, may serve—if they have no other result—to show how fallacious are their theories, based on huge projectiles thrown at low velocities. The Americans appear to have a natural predilection for whatever is big, and they have applied themselves to the production of huge guns, made on every variety of pattern, with very little scientific uniformity or direction. If we are correctly informed, none of these guns have shown that durability which is essential to permanent service, nor have their effects corresponded to the cost and labour bestowed on them. For more than eight

months the Federal forces have been besieging Fort Sumter, a mere battery rather than a fort, constructed more than sixty years ago to cover the harbour of Charleston, at a time when not only rifled guns, but steam vessels, were unknown. The work is, however, on an islet, and is now supported by other works on neighbouring islets, or on the mainland. To attack this fort, whose very name awakens the fiercest passions of the Unionists, considerable bodies of troops have been engaged under General Gilmore, supported by a whole squadron of iron-clads. Yet after 260 days or more of almost incessant fire or attack, Fort Sumter is still held by its valiant garrison, whose chief duty is to raise again the Confederate standard, which is continually shot down. The only effect of the huge projectiles or bolts hurled at the place is said to have improved its defences by throwing up a mountain of earth and iron about it. The following paragraph in the 'Richmond Enquirer' of November 11, 1863, gives a picture of these operations:—

> Since the bombardment commenced on August 17 up to Thursday last, 15,583 shots had been fired at it, of which 12,302 struck; 27 of the garrison have been killed and 69 wounded; the flag has been shot away 34 times, the average weight of shot being 200 lbs., the weight of iron 3,116,000 lbs., or 115,439 lbs. to each man killed, and 30,307 lbs. for each casualty. If the charges of powder averaged 15 lbs., we have 8,699 lbs. to each man killed, and 2,434 lbs. to each casualty. Sumter in ruins laughs at her enemy, who still fears to pass her battered walls. Charleston has a valuable iron mine in the fort.

If the same consumption has gone on from No-

vember to the present time, we had rather not calculate what it amounts to. But these facts appear to us to demonstrate that these cannons, which are called 220 and 440-pounders, are much better adapted to impose on unprofessional men and newspaper correspondents than to take Fort Sumter. Indeed it is wonderful that these guns can have been brought to bear at all, if it be true, as has been stated by a New York paper, that, according to General Gilmore's own report, 2,000 men working for several nights were needed to arm this monster battery. Yet after all this cost and labour, these enormous guns have the capital defect of giving way after 40 or 50 rounds. It was stated at Boston, as an extraordinary thing, that one of them only burst at the 78th round. But allowing as much as 100 rounds per gun, it would seem that in 80 days the bombardment of Fort Sumter must have used up more than 150 monster guns. So long as the American artillerists are carrying on their experiments on this colossal scale, without any adequate result, we may safely conclude that they are not yet on the right track.

This country has happily not been called upon by the sudden emergencies of a terrific war to make its experiments in the presence of an enemy, and our trials have been confined to the pacific ranges of Plumstead Marshes and Shoeburyness. But putting out of account, for the present, the purely experimental guns which have been constructed for the purpose of smashing or piercing iron targets, and are not yet accepted by the service, we proceed to inquire whether England is really possessed at this

moment of heavy rifled ordnance completely adapted to all the purposes of war. We also put aside the various heavy guns of private makers, whose merits are still *sub judice*, and will probably shortly be brought to the test of further experiment. Speaking only of guns made and adopted by the Government, we are told to put our faith in the 100 or 110-pounder of Sir William Armstrong, as the chief arm to supersede the 32 pounder and the 68-pounder which had been, and, indeed, still are, the principal defence of our ports and the principal weapon of our ships. Sir William Armstrong concealed and exaggerated nothing in his statement to the Committee of 1863:—

All Europe was, at that time (1859), adopting rifled ordnance, and the greatest anxiety and uneasiness prevailed at the War Office on account of the want of similar arms in our own service. The threatening aspects of the continent required that large rifled guns should be procured for naval and siege purposes. I was therefore called upon to produce 40-pounders and 100-pounders *without having had an opportunity of testing the patterns by previous trials*, though I had stated in my original report, that I apprehended that the application of breech-loading to large guns would involve an application of parts which would be inconveniently heavy to handle. (*Q.* 3163.)

And in another place:—

Q. 3549. Can you state upon what series of experiments that gun (the 110-pounder) was approved?—*None at all*; there was such an extensive pressure for rifled guns at that time that there was no time for experiments; and it was one of the great difficulties which I had to contend with, that I was obliged to produce the guns under those conditions.

Q. 3550. Were 675 110-pounder guns, costing between

400,000*l.* and 500,000*l.* to the country, adopted without any series of experiments being made?—No, certainly not; but it was some time before the first gun was ready, and probably about 100 guns were in course of construction before we could test one.

And again (*Q.* 3263.) :—

I was at first in hopes that the same material which had been used and found to be sufficient for the 40-pounder, would be found equally suitable for the 100-pounder; but that turns out not to be the case. The vent-piece for the 100-pounder continues still to be a difficulty. I trust that it will be overcome, but, up to the present time, we have not obtained a vent-piece that can be relied upon for the 100-pounder gun.

When the Duke of Somerset was asked his opinion of the Armstrong 100-pounder as a naval gun, he replied that he did not think it entirely satisfactory; that when the Admiralty tried it themselves it did not come up to its reputation; that, for naval purposes, at 200 yards it certainly had not the greatest power; and that our old 68-pounder is a more powerful gun than the 100-pound Armstrong. (*Q.* 5102.) And the Committee itself in its Report stated, upon a review of all the evidence, that 'the old 68-pounder is therefore the most effective gun in the service against iron plates.' This is of course equivalent to an avowal that, for the chief purposes of naval warfare, the British rifled ordnance, now in the service, has added nothing to what our artillery was before. The evidence of the naval officers is, we fear it must be said, conclusive on the subject. Captain Scott, Captain Wainwright, Captain Jerningham, Captain Ewart, all give very ample reasons for not desiring the introduction of these guns in ships; they complain of

the danger of the vent-piece, even with charges of 12 pounds of slow powder, of inaccuracy of aim, of excessive smoke, of fouling; and, in short, all the inconveniences which exist to a certain extent in the principle of the Armstrong gun, become infinitely more prominent in heavy ordnance than in field-pieces. It is due to Sir W. Armstrong to add, that he was himself so conscious of these defects, that, as early as 1859, he applied himself to make a muzzle-loading rifle-cannon on what he terms the '*shunt* principle,' and these experiments have been prosecuted with considerable success. In the 'shunt' gun, the projectile is introduced into the piece on ribs or buttons, like the projectiles of the French artillery; but with this peculiarity, that the projectile enters by one set of grooves and comes out by another set. The 'shunt' gun is in all respects the very opposite of Armstrong's breech-loader.

In all the guns manufactured by Sir W. Armstrong, he adheres, however, to the coil system of construction; that is to say, the gun is built up of drums of hot metal superposed one over the other: the drums are formed by coiling bars of iron round a cylinder and welding them together by the steam-hammer. This, in point of manufacture, is Sir W. Armstrong's chief invention. But it has not escaped attack. For example, Captain Scott, R.N., stated in his evidence:—

Q. 4392. I have been enabled to see a great many of these failures, and I know of a very large number besides.

Q. 4393. Are they failures after the guns were finished for the service, or failures in the course of manufacture?—Both.

Q. 4394. Do you attribute those failures to the inner tubes being made of coiled iron?—I attribute them to the construction of the gun, which I consider faulty.

Q. 4395. And do you attribute them to the inner tubes being made of coils?—That would increase the liability of the gun to fail.

Q. 4396. Has it been proved that the guns have failed in consequence of the inner tubes being made of coiled iron and so proving defective?—The practical test of that is, that they are now beginning to make the internal part of steel. If they had been satisfactory when made of coiled iron, they would not, of course, have begun to make them of steel. (*Report of* 1863, p. 212.)

Whatever be the strength and precision of the welding of the coils under the steam hammer, the pressure applied to the internal surface of the gun at the moment of explosion is so intense, that it is to be feared it will gradually impair the coils, whatever be their thickness.[1] Sir W. Armstrong is himself, we

[1] We have heard that Sir W. Armstrong calculates the pressure applied to his 600-pounder by the discharge of 70 lbs. of powder, at 6,000 tons. The following passage from Sir E. Tennent's book is very interesting, and it deserves attention the more as the true force and application of the force of gunpowder are still very imperfectly known:—'Mr. Longridge, in a paper read before the Institution of Civil Engineers in 1860, quoted the authority of Robins, who calculated the ultimate strength of gunpowder to be 7 tons on the square inch, equal to the pressure of *a thousand atmospheres*: and of Hutton, who believed it to be 17 tons, or 2,400 atmospheres. Colonel Boxer, in his "Treatise on Artillery," makes it 14·4 tons per square inch. Mr. Longridge himself estimated it at 20 tons; but other authorities, he adds, assumed that this might be doubled. A well-informed writer in the "London Observer," Nov. 15, 1863, says the strength of gunpowder in a state of explosion is so vast, and it is from its very nature so difficult to test, that it need not be a cause of surprise that those who have devoted the greatest amount of time and attention to the subject are still at a loss to estimate it with anything like certainty. The imprisoned forces which lie within the ingredients of this substance are such that, when set free, they occupy a space 317 times greater than when in the grains of powder. One

believe, favourable to the idea of a core or inte cylinder of mild steel; and we have recently see Woolwich, guns manufactured on this principle, internal steel cylinder being 3½ inches thick. English constructors of guns hold, that as the ter on the gun, caused by the explosion, decreases rapid proportion from the interior to the exteri the gun, if the greatest power of resistance be in it matters little what is the strength of the exte coils, and they may therefore be made of the we metal. The English therefore contend, that French practice of hooping iron guns with exte steel bands does not augment their strength which the French reply, that having tried this to a great extent, they are very well satisfied it. The consequence was that the French navy chiefly armed with rifled guns of this pattern, w our ships of war, and even our iron-clads, were armed for a long time with the old smooth-bor pounders. Captain Blakely in his evidence (w must, however, be received as that of a disappoi competitor) said:—

The result of this strange hallucination seems to have that we have spent millions on the construction of a which is fit only to compete with English ordnance

cubic inch of gunpowder will evolve on explosion 79·4 cubic nitrogen, and 238 of carbonic acid. The whole of this increase o takes place instantaneously; the gases are liberated by a spark, rapidity greater than the speed of lightning. But this calculation quantity of gases set free at the moment of explosion is give according to the space which they would occupy *at the ordinary te ture of the atmosphere.* Within the barrel of a gun the *heat* at tl ment of explosion has been calculated at 3,000 degrees, and this such an expansion of the gases, that they *would fill* 2,154 *tim space which the powder originally occupied.*'

which would be totally defenceless against the more powerful guns produced in foreign countries.

Q. 4610. Do I understand you to say, that there are other guns in use in foreign countries, which at 1,000 yards would pierce 'the Warrior?'—In August 1861, at Gâvre in France, a 6⅝-inch gun, with 27 lbs. of powder, threw a 99 lb. bolt through a target representing 'the Warrior' at 1,093 yards: that was a rifled gun. (*Report of* 1863.)

This is, in truth, the most material part of the whole question; for although it is interesting to know what effect our guns might produce on the ships of another Power, it is still more interesting to know what effect the guns of another Power might produce on our ships. That French gun described by Captain Blakely was no doubt an experimental weapon, and cannot be said to belong to the service; it was not only a rifled gun, but a rifled *steel* gun; but, in truth, all these prodigious guns, both in France and England, are of an exceptional character, and we do not attach much weight to their performances, except in as far as they serve to aid the progress of scientific discovery. It must be acknowledged that we are all carrying on a tentative process, rather empirically than scientifically, and that the real principles on which heavy ordnance can be constructed, capable of being used with effect in naval warfare, especially against iron-clads, have yet to be worked out.[1] The art is still in its infancy. The Duke of Somerset informed the Committee that he could not tell them what guns were really to be approved for the navy. We in this country have

[1] The 23-ton guns now worked in the 'Captain' and the 'Monarch' on the turret principle, and throwing a bolt of 600 lbs., were not then in existence. 1870.

alone as yet succeeded in piercing 4½-inch and 5-inch iron plates with a steel-headed *shell*; and if we may hazard a conjecture on the subject, we would predict that, as wooden ships were rendered destructible by the invention of General Paixhans, who fired hollow shot from ships' guns, so it will be by explosive rather than by solid projectiles that iron-clads will eventually be attacked. This experiment has already been tried with a certain amount of success, not by any service gun, but by the experimental gun and projectile of Mr. Whitworth. It is described with great spirit by Sir Emerson Tennent:—

The scene of action was transferred to another target, in order to test the encounter between stronger armour and shell of larger size from a gun of greater calibre. A Whitworth 70-pounder (but weighing only four tons) was next tried against a box-target seven feet in length by four feet broad, made to represent a section of the side and interior of a ship. The front was of wrought iron four inches in thickness covering nine inches of oak, and three feet behind it the back consisted of four inches of solid timber faced with two inches of iron plate. The shell, which weighed upwards of 68 lbs., with a bursting charge of 2½ lbs. of powder, was fired as before at 200 yards. It passed unbroken through the armour and teak, exploded against the plate which formed the back of the target; and bursting into large pieces, it drove out the sides, shattering the timber and iron of the box-target to fragments.

This startling result, it is to be observed, was obtained by a gun of no unusual dimensions, being lighter than an ordinary 68-pounder, and with a charge only one-sixth the weight of the projectile.

But the question still remained, whether *five* inches of iron would suffice when *four* inches had failed, and whether safety would be ensured by increasing the distance beyond *two hundred* yards. This momentous issue was tried a few days later

with the same result, but with a still more powerful gun, the Whitworth with a seven-inch bore made at Woolwich being now ready for trial. It was about twelve feet long, and of the calibre of seven inches.

The target on this occasion was a new one, the same against which the Horsfall gun had just before been fired, twenty-one feet in length and fifteen feet high, representing 'the Warrior's' side. Behind 4½ inches of armour-plate there were eighteen inches of teak lined with iron ⅝ths of an inch thick, the whole supported by upright angle-irons at intervals of a foot and a half. The gun was laid at the distance of 600 yards, and after a few shots, to get the range, the grand trial began, the particulars of which cannot be better described than in the words of an eye-witness in communication with 'The Times:'—'The first experimental shot, a solid hexagon weighing 129 lbs., was fired with a charge of 23 lbs. of powder, the piece being laid at half a degree of elevation. It struck the left centre *within an inch of the white spot at which it was aimed*, and at the instant of the tremendous concussion of the metals, a bright sheet of flame was emitted, almost as if a gun had been fired from the target in reply. The shot passed completely through the armour-plate, shattering the teak beyond into minute splinters. It struck full upon one of the massive vertical angle-irons, which it tore in half as if it had been paper, driving the screw-bolts and rivets in all directions. The shot, however, did not pass *through* the target, but remained buried in the teak with its flat head resting against the broken angle-iron. But the fracture it made was much worse than a mere penetration. It was a *smash*, not a hole; and the inner skin of the ship was bulged and torn widely in many places, so that in the case of an actual vessel, such a shot striking on the water-line would have made a leak that nothing could stop. As regards the effect of these flat-fronted shot on iron ships, this experiment was conclusive. Such a missile against a wooden ship would have gone through both sides, making a clean hole and doing little damage; but the iron, without protecting, offered only sufficient resistance to make the fracture, if below the water-line, an irremediable mischief. The next

experiment was with a *shell* loaded with 3 lbs. 8 oz. of powder. The total weight of this projectile was 131 lbs., and it was fired with a charge of 25 lbs. of powder at the same range and elevation as the shot. The effect astounded everyone. The previous *solid shot* at 600 yards was, for Whitworth, nothing very extraordinary; but to get a *shell* through the target at the same range was regarded as almost an impossibility. Yet the shell went completely through everything, bursting apparently when it encountered the last resistance of the inner skin, which the explosion blew completely away; setting on fire for a moment the timber at the back, and sending the bits of shell onward and over what, had it been "the Warrior" herself, would have been her main-deck; and, therefore, right into the midst of her crew.' (*Tennent*, pp. 289–292.)

We do not intend to enter in this place upon the details of the controversy between the partisans of the Armstrong system and the friends of Mr. Whitworth. They must be brought to the test of experiment, and in the meantime a full account of their rival merits has been given us by Sir Emerson Tennent, which it would be idle to seek to condense. There is great wisdom in the dictum of our late revered friend Sir Howard Douglas, that 'the comparative value and importance of the Armstrong and Whitworth guns (so essentially different in construction, dimensions, faculties, and aptitude, that they cannot be *equally* adapted to all the requirements of general service) can only be correctly estimated fairly judged so far as they satisfy the principles of gunnery, and their real service uses proved by actual experiment and protracted trials under circumstances resembling as nearly as possible the requirements and vicissitudes of war.'[1]

[1] Sir H. Douglas's 'Naval Gunnery,' last edition, p. 221.

But there is one part of the question on which we feel bound to record our opinion. We think that the Report of the Committee on rifled cannon in 1858, by which the Armstrong system was adopted, and the other systems virtually set aside, was not based upon a perfectly just and careful inquiry, and that the decision of the Government to act on that report to the full extent was precipitate. We think it still more unfortunate that the Government, having adopted the Armstrong system, should have consented to make the inventor of that system a member of the Ordnance Committee by which other men's inventions were to be judged, Engineer to the War Department, and Superintendent of the Royal Gun Factory. It would have been more creditable to the service, and more just to inventors, to have placed these duties in the hands of the men by whom the guns are to be used; and although we cannot say that the past labours of the Ordnance Committee, or their minutes, have given us a high opinion of their capacity, we doubt not that officers may be found in the service perfectly fit for the purpose. At the same time, we are convinced that no charge of unfairness, or of interested motives, can be brought against Sir W. Armstrong, though he is naturally solicitous to defend the system he has given to the world. Mr. Whitworth, left by the Government to his own resources, has shown an amount of mechanical genius and perseverance by no means inferior to the qualities of his more fortunate rival; and we believe him to have conceived more perfectly than Sir W. Armstrong the theory of modern ordnance. But the results at which he has hitherto

arrived are as yet less complete and less durable. He has endeavoured to accomplish too many distinct purposes with the same gun; and the consequence is, that, although several of his pieces have performed marvellous feats of range, accuracy, and penetration, none of them has as yet been permanently successful. They have not entirely passed out of the experimental stage, but they contain the germ and the promise of results greater than any other artillerist has obtained in this country.

Without dwelling on this part of the subject, which is familiar to the public in many shapes, we shall now revert to the French ordnance, and endeavour to show what our neighbours have accomplished. In the construction of their heavy guns, the French have followed the same cautious, practical, and economical method which they had before pursued in reference to their artillery. Their practice is to transform the old *matériel*, not only with a view to save expense, but also to remain always armed. To be content with present results, but without renouncing future improvements—sedulously to conform to the conditions of military service—specially to adapt different guns to different objects, in the belief that no single class of gun can meet all requirements—these are their principles. Much has been done to give effect to them, and we think that in many respects they may be favourably contrasted with those which have prevailed in Pall Mall and Woolwich.

And first to speak of siege guns. The French arsenals were rich in brass siege guns of the old calibres, and these have been transformed. For all descriptions of moveable artillery, the French have

decided predilection for this metal, which they more correctly term 'bronze,' and which has served in all modern wars down to the present time. The transformation of these pieces has produced a whole family of guns, including the old 12-kilo. field gun, now made a gun of reserve and position; the old long 12-kilo. gun, now a fortress gun; the short 24-kilo. gun and the 50-kilo. gun, both new siege guns. All these guns are of course rifled, and they fire nothing but hollow projectiles: the three 12-guns all fire exactly the same projectiles, though the charge of powder differs in each of them. The short 24-gun weighs 2,000 kilos. or two tons, and the charge is varied, according to the range required, up to a maximum of 2½ kilos. (5½ lbs. English) to carry 5,000 metres, for which distance the gun is sighted. The shell weighs 24 kilos. or 52 lbs. 12 oz. English, and it carries a bursting charge of one kilogramme, or 2 lbs. 3 oz. English. The long 24-gun only differs from the gun just described by its length and weight which is three-quarters of a ton (740 kilos.) more. But the short gun can, by the construction of its carriage, be fired as a mortar. It is designed to breach at a long range any of the revetments of fortifications now existing in the world, including even granite.

The new 50-gun does not weigh more than the short 24, that is, about 2 tons, and it is fired with the same charge of powder; but the weight of the projectile it throws is 51 kilogrammes, or 113 English pounds, and the bursting charge is 3·5 kilos. of powder (7 lbs. 13 oz. English). In case of an attack on works which might defy the 24-gun, the 50 would be brought up. From the low charge of powder

with which it is fired, its penetration is of course less, but, from the explosive power of the projectile thrown, the destructive effect is much greater. Both these guns have the same carriage, which is an important simplification; and with six horses they accompany the movements of an army with much greater facility than an old siege train.

Last autumn a trial was made with these siege guns upon one of the forts that cover the harbour of La Rochelle, known as the Fort Liédot. This fort is a work *à la Vauban*, built of massive limestone masonry: its form is quadrangular with a front of about 100 metres. The ditch is 7 metres deep by 18 in breadth, and in order to render the trial more complete the crest of the glacis had been raised to the height of the parapet, so that the fort itself was totally invisible to the gunners about to attack it. The experiments made on this occasion were varied in character; they were under the direction of a committee of twelve general officers of artillery and engineers, and we understand that not less than 6,000 rounds were fired during the trial, at all ranges, and under different circumstances. The results were considered satisfactory, but of these experiments we are only in a condition to describe one at the present time. The 24 siege gun, at a range of 670 metres (735 yards), with a charge of 800 grammes of powder (1¾ lb.), made a breach of 10 metres in length in the wall of masonry of the fort (which was not visible from the gun) in rather more than 300 rounds, and a detachment of infantry with its arms and accoutrements was enabled to scale the wall in double-quick time. The result might have been arrived at still more rapidly,

if about 50 of the shells had not failed to burst, from that imperfection of the fusee which has caused both to French and English military engineers more trouble than any other detail of their art. It is evident that, as the fire in this instance was directed against an invisible object—that is, a work hidden by its glacis—the trajectory of the projectiles must have been extremely high; this circumstance, followed by so marked a result, tells in favour of the precision and regularity of the French gun. At a greater distance the operation would have been, probably, more easy; and it may be questioned whether Fort Sumter would long resist a fire of this nature, due, not to the enormous weight of projectiles or to the force of penetration, but rather to their explosive power.

Following the same principles and the same course of proceeding, a cannon has been constructed by the French artillerists, expressly for the service of coast defence, which is not less worthy of remark. This gun is, in fact, one of the old iron Paixhans cannon-mortars of 22 centimetres bore, which had been totally thrown aside since the introduction of rifled ordnance. It has been rifled, hooped with steel, mounted on a new revolving platform, which moves with such ease that one man can turn the gun, and the gunner would be able to cover a ship in the offing as effectually as a sportsman covers a partridge. This old-fashioned Paixhans gun is now converted into a new mortar-cannon, capable of throwing hollow projectiles of 170 lbs. weight charged with 7 lbs. of powder, to a distance of 6,000 or 7000 yards. The charge of the gun is regulated by the range

required of it; but since it has been hooped w
steel, the charge has been carried up to 5 ki
about 11 lbs. of gunpowder. The whole weigh
the gun, including the turning table and all t
belongs to it, is about 14 tons; but it is so in
niously constructed and so extremely handy, t
three men suffice to work the piece. This gun un
went a series of trials at the firing-ground of Sat
near Versailles, without exhibiting the slightest fl
and so accurate was the firing that, at a distanc
3,500 yards—the full extent of the range to be
in that place—all the shots fired struck withi
space of 11 metres by 22, or 36 by 72 English f
The object of the gun being to hit a ship at sea w
tolerable certainty, this gun has sufficient preci
for that purpose.

The system of hooping and rifling iron guns, w
has not yet succeeded, and still remains to be
roughly tried, in England, has succeeded in Fra
It has not indeed converted the old *thirties* of
French navy into perfect weapons of war, but it
enabled the French marine to convert to modern
an immense quantity of *matériel* otherwise usele
to give to these guns many of the advantage
rifled guns—and to increase their power to a de
far exceeding that which they had as smooth-
guns. When the Duke of Somerset spoke of
old 68-pounder as still our best naval gun, the q
tion arose, whether any improvement can be m
in the smooth 68-pounder by altering its pre
conditions? The English Admiralty think not:
French marine answer the question very confide
in the affirmative, and have armed their iron-

ships with rifled guns in consequence. Nevertheless, Lord Clarence Paget still declares in the House of Commons, that they are 'not liked by French officers,' and exclaims with touching simplicity, 'Give us, oh, give us a good, plain, wholesome smooth-bore.'[1]

It is admitted that these guns (like all other guns now afloat) cannot be expected to produce much effect against iron-clad ships. But we are able to state that these hooped and rifled iron 'thirties' are capable of supporting a charge which enables them to throw a shot of solid steel through 4½-inch iron plates, at a distance of 100 metres; and likewise to lodge solid steel shot in the plates at distances from 250 to 300 metres. For all the other purposes of war these French rifled and hooped ship guns, with a charge of 7¾ lbs. (3½ kilos.) of powder, and at an elevation of 33 degrees, will throw to a range of 7,000 yards, and even greater distances, hollow projectiles of the weight of 30 kilos. (66 lbs.), carrying a bursting charge of 3 lbs. of powder. And in respect both of range and of accuracy, we have reason to believe that these guns will be found to surpass the smooth-bore 68-pounder throwing solid shot. When the charge is raised to 7½ kilos. (16 lbs. 7 oz.), in order to fire solid steel bolts of 45 kilos. (99 lbs.), it has been found that these guns cannot fire more than 200 or 300 rounds without giving way; but that is about the limit assigned to our own 68-pounders before the Ordnance Committee. With lower charges and a projectile of inferior weight, this hooped and rifled 'thirty gun,' which had been originally intended

[1] Since this was written the superiority of rifled guns may be regarded as established. 1870.

to carry spherical shot of 32 lbs. weight with a ch
of 11 lbs. of powder, is found in France to be a
able and valuable weapon. Some of them have
destroyed or burst by excessive firing in the tria
which they have been subjected; but we fin
inquiry that only two accidents have occurred
these guns have been in use in the French navy,
both these accidents were caused by the explosi
the shell before it left the gun, owing to some
rangement of the fusee; no mischief was don
either case. These iron guns braced together
steel hoops, whose elasticity yields with the ex
sion and contraction of the metal of the gun, ar
found to burst, but when they are worn out they
way gradually, insomuch that we are assured b
eyewitness that, in the French arsenals, he has se
hooped gun so warped by frequent discharges th
resembled the staves of a cask flying off under
action of the sun, but still held together by
hoops round the barrel. The cannon which
used in 1858 by the French to determine the de
of resistance that might be obtained from ho
guns, was subjected to the following trials. B
it was rifled at all, this gun fired 2,000 rounds
a charge of 11 lbs. of powder, without wads, the
resting on the cartridge; it then fired 100 ro
with a charge of 16 lbs. of powder, double-shot
after this preamble, as the gun was still soun
was rifled, and then underwent a series of trials
excessive charges to prove the recoil of the pi
these it resisted for 60 or 70 rounds more befo
was done for; and even then the hoops, being
injured, were taken off and applied to another pi

These trials present a most astonishing contrast to the results of the attempts made at Woolwich to strengthen iron guns. A return is given in the Ordnance Report of 1863 (Appendix 62) of the strengthened cast-iron guns tested in experiments since 1858. Twenty-two cases are given in this return, in every one of which the gun burst. But it seems that in all these cases the hoops were of cast iron, of wrought iron, or of gun metal: there is no evidence that steel hoops have ever been tried at all.[1] The French gunmakers failed in just the same manner as long as they attempted to strengthen cast iron with wrought iron: they have succeeded since they have used steel, taking care that it is coiled spirally round the gun, and not exposed to the direct action of the gas generated by the explosion. They have not indeed attained to the highest charges or the highest rates of initial velocity with these hooped guns, but they have accomplished what it was reasonable to expect; they have used the whole of the old *matériel* of both army and navy; and they have enormously increased the power which these same guns had before they were rifled. In the evidence before the Ordnance Committee the greatest stress is constantly laid upon very high charges and great initial velocity as indispensable conditions, and

[1] Mr. Whitworth offered, in August 1859, to hoop guns for the War Department, probably with what he terms 'homogeneous metal,' a sort of steel; but the offer was not accepted. A further trial is urgently required on this subject. The discussion at the Institution of Civil Engineers in December 1860 throws considerable light upon it; and Mr. Bashley Britten in particular proved to what an extent cast-iron guns may be increased in range and accuracy by the simple process of rifling.

they are so for many purposes; but it is perfectly well known that effects may be obtained from a rifled gun with a lower charge superior to those of a smooth-bore gun throwing the same weight of metal with a higher charge. Moreover, in the French system the result depends quite as much on the bursting charge contained in the hollow projectile, and also on the diameter of the bore, as on the force with which the shell itself is thrown.

But the improvements in French ordnance have not stopped here. The breech-loading system had been deliberately rejected by the French Board of Artillery as a needless complication for field-guns; but they readily acknowledged its manifest advantages if it could be applied to heavy ordnance. It protects the men working the guns from fire directed at embrasures or portholes; it economises space in the narrow compass of casemated batteries or ship's decks; it greatly increases the ease and rapidity with which a heavy gun can be worked and fired. These are advantages well worth a considerable exertion, and the French have endeavoured to accomplish the desired object after their own fashion. They began by sawing off the breech of an old cast-iron gun; in the aperture thus formed they cut a female screw to receive a cylindrical plug, mounted in front with a stopper of elastic steel, and revolving on portions of a screw which fit the female screw in the breech. At the rear of the gun a bracket supports the breech-piece, when it is moved backwards or forwards, to open or to close the gun. This movement is given by a lever acting between two pegs or stops, against which it abuts sharply, so as

to indicate at once to the men working the gun the true position of the breech-piece.

More than 20,000 rounds have been fired with breech-loading heavy guns on this principle, and only one accident has yet occurred. It is true this accident was a most distressing one. It happened on board the gunnery ship, the 'Montebello:' one man was killed and seventeen wounded. But it was proved on careful investigation that the mischief was caused entirely by the carelessness of ignorant gunners in not closing the breech with the lever: the consequence was that the internal plug or stopper was blown out. This accident, therefore, proves nothing at all against the gun. It is stated, on the contrary, in the most positive manner, that in the whole course of ordinary service, and in the trials previously made to prove the strength of the breech apparatus, it has never given way. Yet these trials have been extraordinary. For example: a long 24 breech-loading gun was loaded with 6 kilos. (13¼ lbs.) of powder, then a solid bolt of 50 lbs., then six spherical solid shot, with wads, a circular iron wedge, and six more spherical solid shot separated in like manner: the gun was fired, it did not burst, and the breech remained as good as ever. The identical gun which occasioned the accident on board the 'Montebello' has been restored to the service and repeatedly fired, with devices of all kinds to discover whether the breech apparatus was in fault, but in vain; the gun is still in perfect order. Guns have been burst by excessive charges, without shaking this breech mechanism, which has afterwards been transferred uninjured to other pieces.

Such is the advantage of these cannons on b
ship in point of facility of working, that the nun
of men attached to each of the big guns has
been reduced by the regulations of the French r
from 14 to 8; and as for rapidity of fire, in a t
made on board 'La Gloire,' 50 rounds per gun v
fired with sufficient accuracy at an average of
seconds each round. Moreover, this gun has
considerable advantage that it loads equally
from the breech and from the muzzle.

We do not know whether these particulars
new to the Board of Admiralty, but they certa
were not submitted to the House of Commons C
mittee. On the contrary, the Duke of Some
stated, 'All our reports are that the French gun
a very bad gun, and that it was almost valueless.'
only reports which are of any value are authe
records of experiments. If the Admiralty h
any such authentic reports of experiments with
French naval guns, we hope they will be produ
We have produced a series of facts of a conti
tendency, upon evidence which we have the stron
possible reasons to believe to be strictly accur
and, as the Duke of Somerset himself fell back
the old 68-pounder smooth-bore, and admitted t
the Armstrong 100-pounder is unsatisfactory,
impression upon our minds is that the armamen
our iron-clads and other ships of war was at t
time inferior to that of the French—a questio
will be admitted, of the most vital consequenc
this country; and we shall heartily rejoice if it
be shown that the relation of the two systems of n
artillery has since been changed to our advantage.

any rate, we know with certainty that no doubt whatever is entertained by the highest authorities in France as to the superiority of their own naval guns; and as everything on the subject is published and exhibited in this country, while nothing is published or seen in France, they have this advantage in forming their opinion, that they can know every detail of our system, and we have hitherto known very little of theirs.

It now only remains for us to dispose of what the French have done in artillery of the largest dimensions, in which their proceedings have been less complete. It was assumed in 1859, when these experiments were ordered, that 4½-inch iron plates were the maximum of weight which a sea-going ship could carry, and that they would suffice to protect the vessel. In 1861 the first actual experiments took place, and two guns were allowed to compete. Both of them were of cast steel, hammered, hooped, and loading at the breech: the first, called 'La Nivernaise,' weighed 5,500 kilos. or five tons and a half, and was rifled in 3 grooves; the second, called 'La Marie-Jeanne,' weighed 6 tons, and was rifled in 12 grooves. The first had one row of hoops on it, the second had two. These pieces were fired with charges of 12 kilos. (26 lbs. 7 oz.) of powder, throwing solid projectiles of 45 kilos. (99 lbs.), with which they pierced the 4½-inch plates at the distance of 1,093 yards—this range was the maximum fixed for the trial, and is held to be the maximum required of a marine gun. After about 80 rounds the 'Nivernaise' was done for; but having fired 280 rounds, the 'Marie-Jeanne' was still uninjured, and it was then that this piece underwent

the curious experiment of boring holes in it, to s
the effect of allowing the gases to escape, whicl
described in a former part of this article. T
trials were made in August 1861: they are the s
referred to by Captain Blakely in his evidence
being the only witness before the House of Comı
Committee who seems to have heard of them.
far the French artillerists had proceeded at that
in their attempt to combine the maximum of p
with the minimum of weight and size, these b
the essential conditions of naval ordnance. S
then no further progress has been made, chiefl
we are given to understand, by reason of the wa
cordial co-operation between departments of Gov
ment. In France the Ministry of Marine has
exclusive control over the manufacture of iron
and of guns designed for sea service. It is not
this country, where the whole Ordnance form
reality a distinct branch, now attached to the
Office and under the control of the Secretary of S
for War. The naval authorities of France, there
saw with some jealousy innovations introduced
their service by military officers, and more especi
by Colonel Treuille de Beaulieu, who is the
inventor of all the cannons, both field-guns and h
guns, that we have here described, and was sen
that account by the Emperor to the Great Exhibi
in London in 1862, to report on arms and accou
ments of war.[1]

These differences led to the postponement of
experiments in hollow projectiles from heavy g

[1] Colonel Treuille's Report is published in the second volume o
Reports of the French Commissioners.

which were contemplated three years ago, but it appears that they are now likely to be resumed under the direction of General Lebœuf, an officer of the highest distinction and the new President of the Board of Artillery. General Lebœuf is an aide-de-camp of the Emperor, and he was the commander-in-chief of the artillery in the campaign of Italy in 1859.[1] He is therefore a warm and able supporter of the new French system; but it is due to the Emperor himself to add that rifled ordnance would never have made the progress it has in France, if it had not been for the persevering, intelligent, and sagacious personal attention His Majesty has given to the subject. It is not an exaggeration to say that he has made it one of the chief occupations of his reign, and it is not unreasonable to believe that the results arrived at are commensurate with his exertions. We are aware that the French naval administration has also continued its experiments since 1861, but we are unacquainted with the results of these trials. There is, however, reason to believe that in France, as well as in America and in England, a certain number of monster guns, weighing 12, 15, and even 20 tons, have been constructed. Our readers will have already perceived that we do not attach to these enormous pieces of ordnance the importance which it is the fashion to give them. Their cost is enormous, their duration questionable, their application to the purposes of war limited. We hold it therefore to be no progress in the science of artillery, but rather the reverse, to supply quality

[1] General Lebœuf is now the Major-General of the French army, and chief of the Imperial Staff (1870).

by size, and to make guns enormous before it is certain that they are good. All civilised nations are now, we lament to say, turning their scientific skill and mechanical ingenuity to the improvement of the engines of war, and we have no doubt that the resources of this country will enable us to hold our own in this contest. But for want of a judicious and uniform direction by competent persons, acting on behalf of the Government, many costly mistakes have been made: let us hope that the most fatal of all errors will not be added to them—that, namely, of flattering ourselves that we have already attained to unrivalled superiority over the rest of the world.

APPENDIX.

LOI SUR LE RECRUTEMENT DE L'ARMÉE ET L'ORGANISATION DE LA GARDE NATIONALE MOBILE.

Du 1er février 1868.

NAPOLÉON, par la grâce de Dieu et la volonté nationale, EMPEREUR DES FRANÇAIS, à tous présents et à venir, SALUT.

AVONS SANCTIONNÉ ET SANCTIONNONS, PROMULGUÉ et PROMULGUONS ce qui suit :

LOI.

Extrait du procès-verbal du Corps législatif.

LE CORPS LÉGISLATIF A ADOPTÉ LE PROJET DE LOI dont la teneur suit :

TITRE Ier.

DU RECRUTEMENT DE L'ARMÉE.

ART. 1er. Les articles 4, 13, 15, 30, 33 et 36 de la loi du 21 mars 1832 sont modifiés ainsi qu'il suit :

Art. 4. Le tableau de la répartition entre les départements du nombre d'hommes à fournir en vertu de la loi annuelle du contingent pour les troupes de terre et de mer sera annexé à ladite loi.

Les premiers numéros sortis au tirage au sort déterminé par l'article suivant formeront le contingent des troupes de mer.

Le mode de cette répartition sera fixé par la même loi.

Art. 13. Seront exemptés et remplacés, dans l'ord numéros subséquents, les jeunes gens que leur numér gnera pour faire partie du contingent, et qui se trou dans un des cas suivants, savoir :

1° Ceux qui n'auront pas la taille d'un mètre cinq cinq centimètres ;

2° Ceux que leurs infirmités rendront impropres au se

3° L'aîné d'orphelins de père et de mère ;

4° Le fils unique, ou l'aîné des fils, ou, à défaut de de gendre, le petit-fils unique ou l'aîné des petits-fils femme actuellement veuve, ou d'un père aveugle ou dans sa soixante et dixième année ;

Dans les cas prévus par les paragraphes ci-dessus troisième et quatrième, le frère puîné jouira de l'exemp le frère aîné est aveugle ou atteint de toute autre infirm curable qui le rende impotent ;

5° Le plus âgé de deux frères appelés à faire par même tirage et désignés tous deux par le sort, si le plus est reconnu propre au service ;

6° Celui dont un frère sera sous les drapeaux à tou titre que pour remplacement ;

7° Celui dont un frère sera mort en activité de serv aura été réformé ou admis à la retraite, pour blessures dans un service commandé, ou infirmités contractées d armées de terre ou de mer.

L'exemption accordée conformément, soit au n° 6, s n° 7 ci-dessus, ne sera appliquée qu'à un seul frère p même cas, mais elle se répétera dans la même famille de fois que les mêmes droits s'y reproduiront.

Seront néanmoins comptées en déduction desdites e tions les exemptions déjà accordées aux frères vivar vertu des n^os^ 1, 3, 4 et 5 du présent article.

Le jeune homme omis qui ne se sera pas présenté, l ou ses ayants cause, pour concourir au tirage de la cl laquelle il appartenait, ne pourra réclamer le bénéfi exemptions indiquées par les n^os^ 3, 4, 5, 6 et 7 du p article, si les causes de ses exemptions ne sont survenu

postérieurement à la clôture des listes du contingent de sa classe.

Les causes d'exemption prévues par les articles 3, 4, 5, 6 et 7 ci-dessus devront, pour produire leur effet, exister au jour où le conseil de révision est appelé à statuer.

Celles qui surviendront entre la décision du conseil de révision et le 1er juillet, point de départ de la durée du service de chaque contingent, ne modifieront pas la position légale des jeunes gens désignés pour en faire définitivement partie.

Néanmoins, l'appelé qui, postérieurement, soit à la décision du conseil de révision, soit au 1er juillet, deviendra l'aîné d'orphelins de père et de mère, le fils unique ou l'aîné des fils, ou, à défaut du fils ou du gendre, le petit-fils unique ou l'aîné des petits-fils d'une femme veuve ou d'un père aveugle, sera, sur sa demande et pour le temps qu'il a encore à servir, assimilé au militaire de la réserve et ne pourra plus être rappelé qu'en temps de guerre.

Art. 15. Les opérations du recrutement seront revues, les réclamations auxquelles ces opérations auraient pu donner lieu seront entendues, et les causes d'exemption et de déduction seront jugées, en séance publique, par un conseil de révision composé :

Du préfet, président, ou, à son défaut, du secrétaire général, ou du conseiller de préfecture délégué par le préfet ;

D'un conseiller de préfecture ;

D'un membre du conseil général du département ;

D'un membre du conseil d'arrondissement, tous trois à la désignation du préfet ;

D'un officier général ou supérieur désigné par l'Empereur.

Un membre de l'intendance militaire assistera aux opérations du conseil de révision ; il sera entendu toutes les fois qu'il le demandera et pourra faire consigner ses observations aux registres des délibérations.

Le conseil de révision se transportera dans les divers cantons ; toutefois, suivant les localités, le préfet pourra réunir dans le même lieu plusieurs cantons pour les opérations du conseil.

Le sous-préfet, ou le fonctionnaire par lequel il aurait été

suppléé pour les opérations du tirage, assistera aux s
que le conseil de révision tiendra dans l'étendue d
arrondissement.

Il y aura voix consultative.

Art. 30. La durée du service pour les jeunes soldats
partie des deux portions du contingent mentionnée
l'article précédent *est de cinq ans*, à l'expiration desq
passent dans la réserve, où *ils servent quatre ans*, en d
rant affectés, suivant leur service antérieur, soit à l'ar
terre, soit à l'armée de mer.

La durée du service compte du 1er juillet de l'an
tirage au sort.

Les militaires de la réserve ne peuvent être rap
l'activité qu'en temps de guerre, par décret de l'Em
après épuisement complet des classes précédentes, et par
en commençant par la moins ancienne.

Ce rappel pourra être fait d'une manière distincte
dépendante pour la réserve de l'armée de terre et po
de l'armée de mer.

Les militaires de la réserve peuvent se marier sans au
tion dans les trois dernières années de leur service dan
serve. Cette faculté est suspendue par l'effet du dé
rappel à l'activité.

Les hommes mariés de la réserve restent soumis à to
obligations du service militaire.

Le 30 juin de chaque année, en temps de paix, les
qui auront achevé leur temps de service dans la rés
cevront leur congé définitif.

Ils le recevront, en temps de guerre, immédiatemer
l'arrivée au corps du contingent destiné à les remplacer

Lorsqu'il y aura lieu d'accorder des congés illimi
seront délivrés, dans chaque corps, aux militaires l
anciens de service effectif sous les drapeaux, et de pré
à ceux qui les demanderont.

Les hommes laissés ou envoyés en congé pourro
soumis à des revues et à des exercices périodiques qu
fixés par le ministre de la guerre.

Art. 33. La durée de l'engagement volontaire sera de deux ans au moins.

L'engagement volontaire ne donnera lieu à l'exemption prononcée par le n° 6 de l'article 13 ci-dessus qu'autant qu'il aura été contracté pour une durée de neuf ans.

Dans aucun cas, les engagés volontaires ne pourront être envoyés en congé sans leur consentement.

Art. 36. Les rengagements pourront être reçus même pour deux ans, et ne pourront excéder la durée de cinq ans.

Les rengagements ne pourront être reçus que pendant le cours de la dernière année de service sous les drapeaux, ou de l'année qui précédera l'époque de la libération définitive.

Après cinq ans de service sous les drapeaux, ils donneront droit à une haute paye.

Les autres conditions seront déterminées par des décrets insérés au Bulletin des lois.

2. Les titres II, III et V de la loi du 26 avril 1855, relative à la dotation de l'armée, et les lois des 24 juillet 1860 et 4 juin 1864, sont abrogés.

Les substitutions d'hommes sur la liste cantonale et le remplacement sont autorisés conformément aux articles 17, 18, 19, 20, 21, 22, 23, 24, 28 et 29 de la loi du 21 mars 1832, lesquels sont remis en vigueur.

Est également remis en vigueur le titre III de la même loi, sauf les modifications apportées aux articles 33 et 36 par l'article 1er de la présente loi.

TITRE II.

DE LA GARDE NATIONALE MOBILE.

SECTION Ire.

DE SA COMPOSITION.—DE SON OBJET.—DE LA DURÉE DU SERVICE.

3. Une garde nationale mobile sera constituée à l'effet de concourir, comme auxiliaire de l'armée active, à la défense des places fortes, des côtes et frontières de l'Empire, et au maintien de l'ordre dans l'intérieur.

Elle ne peut être appelée à l'activité que par une loi spéciale.

Toutefois, les bataillons qui la composent peuvent être réunis au chef-lieu ou sur un point quelconque de leur département, par un décret de l'Empereur, dans les vingt jours précédant la présentation de la loi de mise en activité.

Dans ce cas, le ministre de la guerre pourvoit au logement et à la nourriture des officiers, sous-officiers, caporaux et soldats.

4. La garde nationale mobile se compose :

1° Des jeunes gens des classes des années 1867 et suivantes qui n'ont pas été compris dans le contingent, en raison de leur numéro du tirage ;

2° De ceux des mêmes classes auxquels il a été fait application des cas d'exemption prévus par les nos 3, 4, 5, 6 et 7 de l'article 13 de la loi du 21 mars 1832 ;

3° De ceux des mêmes classes qui se seront fait remplacer dans l'armée.

Peuvent également être admis dans la garde nationale mobile ceux qui, libérés du service militaire ou de la garde nationale mobile, demandent à en faire partie.

Les substitutions sont autorisées dans la famille jusqu'au sixième degré inclusivement ; le substitué doit être âgé de moins de quarante ans et remplir les conditions prévues par la loi de 1832.

Les conseils de révision exemptent du service de la garde nationale mobile les jeunes gens compris sous les paragraphes 1 et 2 de l'article 13 de la loi de 1832.

Les conseils de révision dispensent du service dans la garde nationale mobile :

1° Ceux auxquels leurs fonctions confèrent le droit de requérir la force publique ;

2° Les ouvriers des établissements de la marine impériale et ceux des arsenaux et manufactures d'armes de l'État dont les services ouvrent des droits à la pension de retraite ;

3° Les préposés du service actif des douanes et des contributions indirectes ;

4° Les facteurs de la poste aux lettres;

5° Les mécaniciens de locomotive sur les chemins de fer.

Les conseils de révision dispensent également les jeunes gens se trouvant dans l'un des cas de dispenses prévues par l'article 14 de la loi de 1832, par l'article 79 de la loi du 15 mars 1850 et par l'article 18 de la loi du 10 avril 1867, les jeunes gens qui auront contracté avant le tirage au sort l'engagement de rester dix ans dans l'enseignement primaire, et qui seront attachés, soit en qualité d'instituteur ou en qualité d'instituteur adjoint, à une école libre existant depuis au moins deux ans, ayant au moins trente élèves.

La dispense ne peut s'appliquer aux instituteurs et aux instituteurs adjoints d'une même école que dans la proportion d'une par chaque fraction de trente élèves.

Les conseils de révision dispenseront également, à titre de soutiens de famille et jusqu'à concurrence de dix pour cent, ceux qui auront le plus de titres à la dispense.

Sont exclus de la garde nationale mobile les individus désignés aux nos 1 et 2 de l'article 2 de la loi du 21 mars 1832.

5. La durée du service dans la garde nationale mobile est de cinq ans.

Elle compte du 1er juillet de l'année du tirage au sort.

6. Les jeunes gens de la garde nationale mobile continuent à jouir de tous les droits du citoyen; ils peuvent contracter mariage sans autorisation, à quelque période que ce soit de leur service; ils peuvent librement changer de domicile ou de résidence; ils peuvent voyager en France ou à l'étranger, sans que le manquement aux exercices ou aux réunions résultant de cette absence puisse devenir contre eux le motif d'une poursuite.

Tout garde national mobile peut être admis comme remplaçant, dans l'armée active ou dans la réserve, s'il remplit les conditions des articles 19, 20 et 21 de la loi du 21 mars 1832; dans ce cas, le remplacé est tenu de s'habiller et de s'équiper à ses frais comme garde national mobile.

7. En cas d'appel à l'activité ou de réunion des bataillons de la garde nationale mobile conformément à l'article 3 de la

présente loi, le conseil de révision, réuni au chef-lieu de département ou d'arrondissement, dispensera du service d'activité, à titre de soutiens de famille et jusqu'à concurrence de quatre pour cent, ceux qui auront le plus de titres à cette dispense.

Pourront se faire remplacer par un Français âgé de moins de quarante ans et remplissant les autres conditions exigées par les articles 19, 20 et 21 de la loi du 21 mars 1832, ceux qui se trouvent dans l'un des cas d'exemption prévus par les nos 3, 4, 5, 6 et 7 de l'article 13 de ladite loi.

Le conseil de révision statuera sur les demandes de remplacement et sur l'admission des remplaçants.

SECTION II.

DE L'ORGANISATION DE LA GARDE NATIONALE MOBILE.—DE SON INSTRUCTION.—DES PEINES DISCIPLINAIRES.

8. La garde nationale mobile est organisée par départements, en bataillons, compagnies et batteries.

Les officiers sont nommés par l'Empereur, et les sous-officiers et caporaux par l'autorité militaire.

Ils ne reçoivent de traitement que si la garde nationale mobile est appelée à l'activité.

Sont seuls exceptés de cette disposition, l'officier chargé spécialement de l'administration et les officiers et sous-officiers instructeurs.

9. Les jeunes gens de la garde nationale mobile sont soumis, à moins d'absence légitime :

1° A des exercices qui ont lieu dans le canton de la résidence ou du domicile ;

2° A des réunions par compagnie ou par bataillon, qui ont lieu dans la circonscription de la compagnie ou du bataillon.

Chaque exercice ou réunion ne peut donner lieu, pour les jeunes gens qui y sont appelés, à un déplacement de plus d'une journée.

Ces exercices ou réunions ne peuvent se répéter plus de quinze fois par année.

Toute absence dont les causes ne sont pas reconnues légitimes sera constatée par l'officier ou le sous-officier de la compagnie,

qui devra faire viser son rapport par le maire de la commune, lequel donnera son avis.

Après trois constatations faites dans l'espace d'un an, le garde national mobile peut être poursuivi, conformément à l'article 83 de la loi du 13 juin 1851, devant le tribunal correctionnel, lequel, après vérification des causes d'absence, le condamne, s'il y a lieu, aux peines édictées par ledit article.

Sont exemptés des exercices ceux qui justifient d'une connaissance suffisante du maniement des armes et de l'école du soldat.

10. Pendant la durée des exercices et des réunions, la garde nationale mobile est soumise à la discipline réglée par les articles 113, 114 et 116 de la section II du titre IV de la loi du 13 juin 1851, sur la garde nationale, ainsi que par les articles 5, 81 et 83 de ladite loi.

Les peines énoncées à l'article 113 sont applicables, selon la gravité des cas, aux fautes énumérées aux articles 73, 74 et 76 de la section 1re du titre IV.

La privation du grade est encourue dans les cas prévus aux articles 75 et 79 ; elle est prononcée :

Pour les officiers, par l'Empereur, sur un rapport du ministre de la guerre ;

Pour les sous-officiers, caporaux ou brigadiers, par l'autorité militaire.

Les officiers, sous-officiers, caporaux ou brigadiers employés à l'administration ou à l'instruction sont soumis à la discipline militaire pendant la durée de leurs fonctions.

SECTION III.

DE LA MISE EN ACTIVITÉ.

11. A dater de la promulgation de la loi de mise en activité de la garde nationale mobile, les officiers, sous-officiers, caporaux et gardes nationaux qui la composent sont soumis à la discipline et aux lois militaires. Ils supportent les charges et jouissent des avantages attachés à la situation des soldats, caporaux, sous-officiers et officiers de l'armée.

12. Sont abrogées toutes les dispositions contraires à la présente loi, et spécialement le titre VI de la loi du 22 mars 1831.

SECTION IV.

DISPOSITIONS TRANSITOIRES RELATIVES AU TITRE Ier.

13. Les jeunes gens compris dans le contingent de la classe de 1867 jouiront simultanément du droit de se faire remplacer ou exonérer.

Le nombre des exonérations ne pourra dépasser le nombre des rengagements et des engagements après libération qui auront été contractés avant le 1er avril 1868.

Le nombre des exonérations sera réparti par canton, par arrêté du ministre de la guerre, proportionnellement à celui des exonérations prononcées en 1867 dans le même canton.

Les exonérations seront prononcées suivant l'ordre des numéros des tirages, en commençant par les derniers.

DISPOSITIONS TRANSITOIRES RELATIVES AU TITRE II.

14. Font partie de la garde nationale mobile, à partir de la promulgation de la présente loi, sauf les exceptions prévues par l'article 4 de la présente loi, les hommes célibataires ou veufs sans enfants des classes de 1866, 1865, 1864 qui ont été libérés par les conseils de révision.

Ceux de la classe de 1866 y serviront quatre ans.

Ceux de la classe de 1865 y serviront trois ans.

Ceux de la classe de 1864 y serviront deux ans.

L'engagement de rester dix ans dans l'enseignement, prévu par les lois de 1832, 1850 et 1867, pourra être pris au moment où il sera procédé à la formation de la garde nationale mobile, en vertu des dispositions transitoires ci-dessus.

15. Le maire, assisté des quatre conseillers municipaux les premiers inscrits sur le tableau, dresse l'état de recensement des jeunes gens de sa commune qui doivent faire partie de la garde nationale mobile conformément à l'article précédent.

A Paris et à Lyon, cet état est dressé par le préfet ou son délégué, assisté de trois membres du conseil municipal et du maire de chaque arrondissement, pour le recensement de cet arrondissement.

16. Un conseil de révision par arrondissement juge, en

séance publique, les causes d'exemption, qui ne peuvent être que celles prévues par les nos 1 et 2 de l'article 13 de la loi de 1832, et les cas de dispense prévus par l'article 14 de la même loi et par les articles 79 de la loi du 15 mars 1850 et 18 de la loi du 10 avril 1867.

Toutefois, ce conseil de révision peut exempter, comme soutiens de famille, jusqu'à concurrence de dix pour cent, ceux qui auront le plus de titres à l'exemption.

Ce conseil est présidé :

Au chef-lieu du département,

Par le préfet ou par le secrétaire général ou le conseiller de préfecture délégué par le préfet ;

Au chef-lieu des autres arrondissements.

Par le sous-préfet.

Il comprend en outre :

Un membre du conseil général ;

Un membre du conseil d'arrondissement ;

Un officier désigné par le général commandant le département.

En cas de partage, la voix du président est prépondérante.

Un médecin militaire est attaché au conseil de révision.

Ce conseil se transporte successivement dans les différents chefs-lieux et cantons de l'arrondissement.

Toutefois, selon les localités, le président peut réunir, pour les opérations du conseil, les jeunes gens appartenant à plusieurs cantons.

17. La réunion des listes arrêtées par les conseils de révision des arrondissements forme la liste du contingent départemental.

Les jeunes gens faisant partie de ce contingent sont inscrits sur les registres matricules de la garde nationale mobile du département et répartis en compagnies et en bataillons d'infanterie et en batteries d'artillerie.

Délibéré en séance publique, à Paris, le 14 janvier 1868.

Le Président,
Signé Schneider.

Les Secrétaires,
Signé Marquis de Conegliano, Mège, de Guilloutet, Bournat, Martel, comte W. de La Valette.

Extrait du procès-verbal du Sénat.

Le Sénat ne s'oppose pas à la promulgation de la loi relative à l'armée et à la garde nationale mobile.

Délibéré et voté, au palais du Sénat, le 28 janvier 1868.

Le Président,
Signé TROPLONG.

Les Secrétaires,
Signé CHAIX D'EST-ANGE, E. DE MENTQUE, HUBERT-DELISLE, général DE LA RUE.

Vu et scellé du sceau du Sénat :
Le Sénateur Secrétaire,
Signé CHAIX D'EST-ANGE.

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Fait au palais des Tuileries, le 1er février 1868.

Signé NAPOLÉON.
Par l'Empereur :
Le Ministre d'État,
Signé E. ROUHER.

Vu et scellé du grand sceau :
Le Garde des sceaux, Ministre secrétaire d'État au département de la justice et des cultes,
Signé J. BAROCHE.

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